DESENCINE PROGRESS

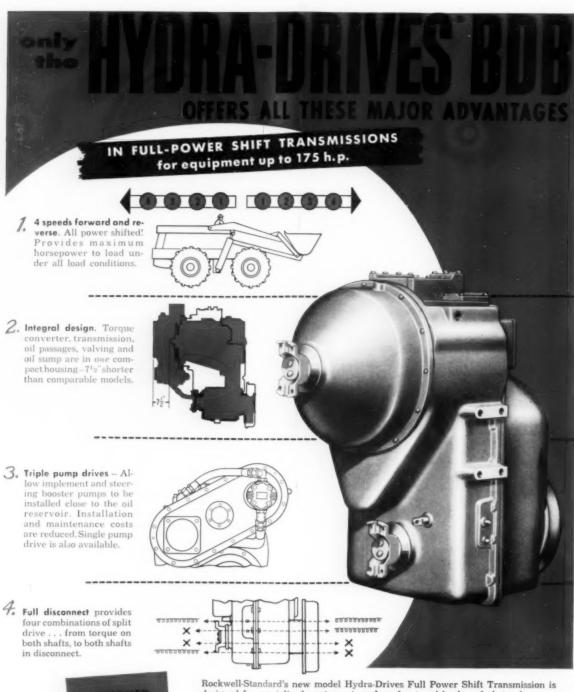
FIVE DOLLARS PER YEAR

URBINES

GAS

OVEMBER - 1960

FIFTY CENTS PER COPY



Rockwell-Standard's new model Hydra-Drives Full Power Shift Transmission is designed for specialized equipment, such as front end loaders, fork trucks, scrapers, crane carriers, rubber tire tractors and military vehicles.

The Hydra-Drives BDB offers easier servicing and maintenance. There are fewer moving parts and bearings. The simple, rugged countershaft design and

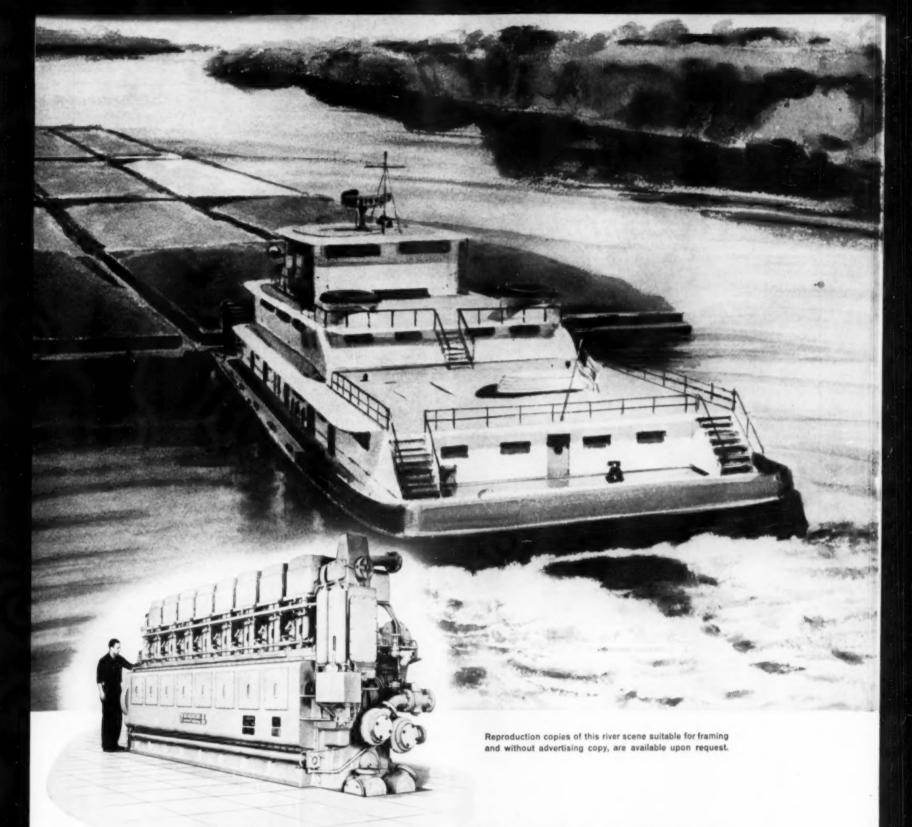
spur gears simplify maintenance.

A larger CBD Transmission is also available for equipment up to 250 H.P.

Another Product of ...



Transmission and Axle Division, Detroit 32, Michigan



Nordberg Diesels pay off in towboat service

To pay off in the towing business, a towboat has to keep on the move—putting its push behind all types of tows, under all kinds of river conditions—with no time out for uncertain engine performance or lack of maneuverability.

This is the kind of duty that's made to order for Nordberg engines . . . for these powerful, quickstarting responsive diesels have what it takes to deliver 'round-the-clock towboat propulsion power and to fight the battles of "old man river."

Nordberg heavy duty 4-cycle diesels for towboat propulsion are available as non-reversing engines for reverse-reduction gears and diesel-electric drive, or in direct-reversing types for direct drive and single or multiple drives. Built in both in-line and V-types, in sizes to 4650 horsepower.

NORDBERG MANUFACTURING COMPANY Milwaukee 1, Wisconsin

ATLANTA • CLEVELAND • DALLAS • DULUTH • HOUSTON • KANSAS CITY • MINNEAPOLIS • NEW ORLEANS • NEW YORK • ST. LOUIS SAN FRANCISCO • TAMPA • WASHINGTON • TORONTO • VANCOUVER • JOHANNESBURG • LONDON • MEXICO, D.F.



General Motors Reliability in Action...

HOT JOB...RUNS COOL WITH GM HARRISON



Designed to mount in the bottom tank of conventional type radiators, this Harrison Oil Cooler is another reliable product of General Motors Research and Engineering.

HARRISON OIL COOLERS PROVE METTLE IN HOT-METAL OPERATION!

Taking on the hot job is a Harrison specialty. For example, this diesel-powered shovel handles 700°F slag in a Gary steel mill 24 hours a day, seven days a week. To meet this rugged demand, Harrison Oil Coolers-with built-in reliability-are specified. We call this reliability . . . "measurable excellence." It's an "initial design to end use" concept which makes Harrison heat transfer products perform as intended . . . for the time required ... under the conditions specified. You'll find Harrison reliability in 15 basic types of heat transfer construction . . . a complete line of designs that permits the engineering selectivity that assures the right heat exchanger for every application. To save time and money on your temperature control problems, call in a Harrison Sales Engineer at the design stage.



Free For an informative 48-page, brochure on the complete Harrison ligo... write to Department 902.



HARRISON RADIATOR DIVISION, GENERAL MOTORS CORPORATION, LOCKPORT, NEW YORK

Editor and Publisher REX W. WADMAN

DIESEL ENGINES - DUAL FUEL ENGINES - NATURAL GAS ENGINES - GAS TURBINES

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DIESEL AND GAS EN-GINE PROGRESS is in-dexed regularly by Engineer-ing Index, Inc. and is avail-able in microfilm editions from University Microfilms, Inc., Ann Arbor, Michigan.

MEMBER OF

Business Publications Audit of Circulation, Inc.

DIESEL AND GAS EN-GINE PROGRESS for November, 1960, Vol. XXVI, No. 11. Published Monthly by Diesel Engines, Inc., 1701 W. Wisconsin Ave., Milwau-kee 3, Wisc. Phone Division 4-5355. Subscription rates are 55.00 for U.S.A. and posses-sions. All other countries

55.00 for U.S.A. and possessions. All other countries \$7.50 per year. Subscriptions may be paid the London Office at £2-12s-6d per year.

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Sixth of a series

POWERED FOR PERFORMANCE, PROFIT, AND REPEAT SALES

In construction work, competition forces attention on engine performance, engine initial costs, and engine operating costs. Caterpillar has respected these user considerations for nearly 30 years. During this time, increasing numbers of contractors have been saying, "Power mine with a Cat." And for good reason.

Caterpillar Edgines are designed to complement the performance of the original equipment manufacturer's machine. They are designed for maximum time between overhauls. They are designed for minimum consumption of low-cost diesel fuel. These and other built-in quality features enable contractors to operate with maximum profits.

In addition to dependability and good design, more than 500 Dealer Stores in the United States and Canada stand behind Caterpillar Diesels with service and parts stocks second to none in the business.

Users return to the Original Equipment Dealer who sells Cat-powered machines because they know he's giving them full value for their dollar. For further information, write for free literature on the application of Cat Engines in Original Equipment.

WHEN YOUR CUSTOMER SPECIFIES A CAT ENGINE ... HE GETS:

- World-wide parts and service availability
- . Competitive initial and low operating costs
- Excellence of design, material, and workmanship

CATERPILLAR

Engine Division, Caterpillar Tractor Co., Peoria, Illinois, U.S.A.



New C-300 Oil Keeps 4 Marine Diesels "Remarkably Clean"

Nantucket Express Lines operate the diesel powered "Tek-Fleet" which consists of a former millionaire's yacht and a former air-sea rescue vessel. The yacht, now called the "Catherine-Tek," is powered by two Superior 320 h.p. 8-cylinder diesels while the "Kateri-Tek" has two Superior 240 h.p. diesels of 6-cylinders each. The two boats operate during the summer season carrying about 20,000 passengers to the islands off New England.

Mr. Joseph T. Gelinas, President of Nantucket Express says, "Our season is only four months a year, so we have to be assured that the diesels are in top-notch shape. We

Inspection of the four diesel engines revealed that C-300 dispersant-detergent action has kept them "remarkably clean." During the past four years, there has never been a case of stuck rings. Maintenance records show that

been a case of stuck rings. Maintenance records show that filters last longer with C-300 and oil consumption has defi-

able today."

nitely dropped.

Whether your diesels are marine or stationary or portable . . . you'll find an ideal C-Series oil that is designed to fit your engine and operating conditions.

certainly couldn't afford a break-down during our busy

season. For this reason, we selected Cities Service C-300

oil which, in our opinion, is the best diesel lubricant avail-

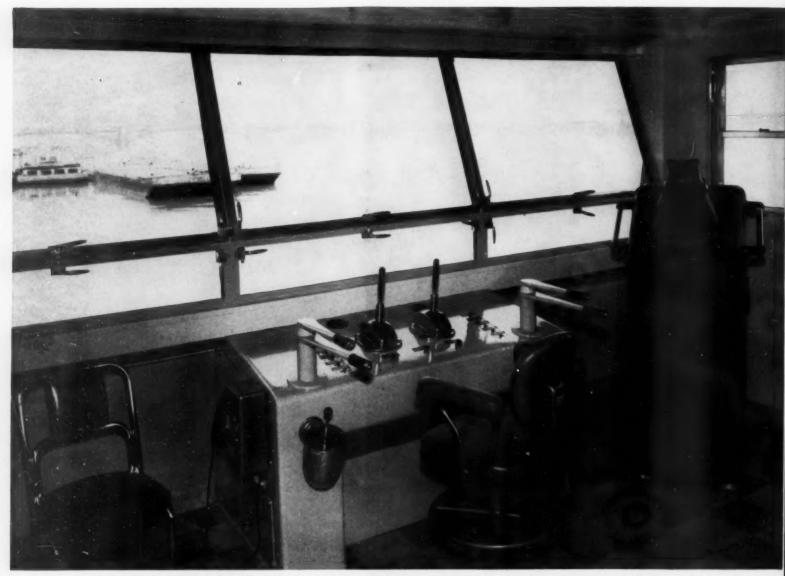
For full information on the C-Series diesel lubricants, call your nearest Cities Service office or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, New York.

The Kateri-Tek docks at Martha's Vineyard with a full capacity crowd. Over 20,000 passengers per season travel the "Tek-Fleet" to the islands off the coast of New England.



CITIES (2) SERVICE

QUALITY PETROLEUM PRODUCTS



Westinghouse pneumatic controls have contributed much to the safety, efficiency and economy of diesel-powered craft. In the pilothouse and engine room, these small, panel-mounted devices with their finger tip control assure split-second response to any desired maneuver or speed.



Westinghouse AIR CIRCUITRY gives you finger tip

-and it is easy and economical to install and maintain

AIR CIRCUITRY is the application of Westinghouse pneumatic control systems to the operation of diesel and other types of engine-powered machinery, equipment and craft. Among its many benefits are:

EASE OF OPERATION—With Westinghouse pneumatic controls, compressed air is the "muscle" that starts, stops or controls the engine, shifts gears, engages clutches, etc. Only a finger tip touch of the control lever is required. And, because Air Circuitry replaces awkward hand levers, there is no

operator fatigue.

SAFETY INTERLOCKS—Even inexperienced personnel can safely operate your equipment because interlocks in the Air Circuitry controls rule out the dangers of improper operation or power failure.

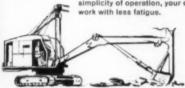
WIDE CONTROL LATITUDE—Your equipment can be operated from any number of remote control stations. Engines and clutches can be operated individually or in unison by a single control lever.



Big shovels and cranes and other diesel-powered heavy construction machines can be manipulated with the greatest of ease when equipped with Westinghouse pneumatic controls. And thanks to the ease and simplicity of operation, your operators can handle considerably more work with less fatigue.



Westinghouse Air Circuitry systems are widely used in the oil fields. Their easy finger tip control helps speed the drilling operation. They give you safe, sure, fast-responding control. You can operate them for long periods with little maintenance.





control of your diesel-powered equipment

SIMPLE INSTALLATION—Westinghouse pneumatic controls can be installed quickly by any competent mechanic. No adjustment or fitting of mechanical linkage is required.

INEXPENSIVE MAINTENANCE—Westinghouse pneumatic controls have few wearing parts and fewer adjustments. Equip-

ment is uncomplicated and long in service. Parts and service are readily available in all large cities.

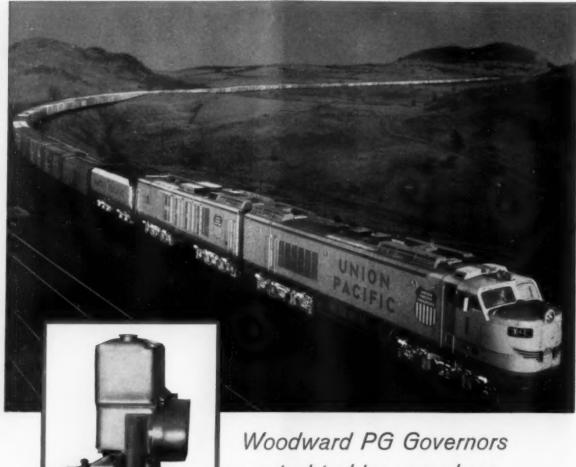
If you are considering new equipment or modernizing your old equipment, our engineers will be glad to consult with you. Write today for free booklets.

See the Yellow Pages under Cylinders for the Name of Your Local Distributor



WESTINGHOUSE AIR BRAKE COMPANY

INDUSTRIAL PRODUCTS DIVISION, WILMERDING, PENNSYLVANIA



Woodward PG Governors control turbine speeds on giant Union Pacific gas turbine electrics

A special version of the Woodward PG Governor is now controlling the gas turbines of Union Pacific's new turbine-electric locomotives. Built by General Electric, these giant gas turbines develop over 8500 horse power and deliver 7000 horse power at the rail for tractive effort. These are the most powerful single unit locomotives now in service. Besides the usual features found in the Woodward PG, this gas turbine model performs these functions: limits fuel to hold exhaust temperatures to safe maximums . . . controls load by changing generator excitation . . . permits rapid fuel change in low exhaust temperature range with gradual control up to maximum temperature point . . . limits fuel to predetermined value for starting . . . compensates fuel settings for changes of ambient barometric pressure and temperature . . . features adjustable mechanical fuel limit. Let us send you complete data on Woodward Governors for your gas turbine engine requirements.

FG SOVERNOR



WOODWARD GOVERNOR COMPANY

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WORLD'S OLDEST AND LARGEST MANUFACTURER OF HYDRAULIC GOVERNORS EXCLUSIVELY

SCHW



Fans



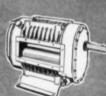
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Turbochargers



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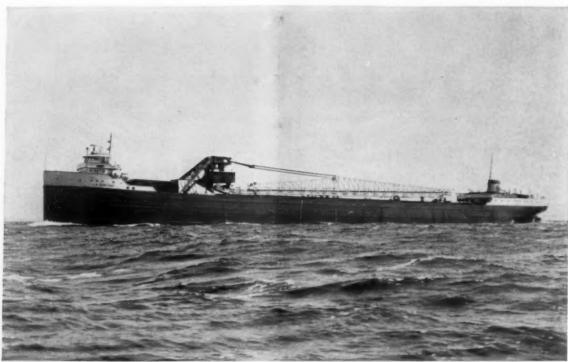


Pumps



Shaft Seals

SCHWITZER CORPORATION INDIANAPOLIS 7, INDIANA U.S.A.



BENDIX DIESEL FUEL INJECTION PLAYS KEY ROLE IN RE-POWERING, MODERNIZING "J. R. SENSIBAR"

The M/V J. R. Sensibar, 552-foot, old speed. In addition, the new equipself-unloading coal carrier in Great Lakes service, recently was repowered and modernized by her owners, the Columbia Transportation Division, Oglebay Norton Company, Cleveland.

The job, done by the Christy Corporation of Sturgeon Bay, involved replacing the old steam turbine drive with a new Nordberg marine diesel engine. Developing 3200 hp at 515 rpm the new engine provides power for both propulsion and the selfunloading system.

The J. R. Sensibar now makes 15 mph, an increase of 3 mph over her ment requires less engine room space, resulting in a 1200-short-ton increase in the ship's coal-carrying capacity.

The Nordberg engine is served by Bendix® Diesel Fuel Injection equipment. This equipment fits in perfectly with any modernization plan, assuring more dependable, economical performance around the clock. It is particularly valuable where 12-month operation is impossible, as in the Great Lakes. Every minute counts in this kind of shipping, and Bendix Diesel Fuel Injection helps keep the engine on the job. Leading diesel engine builders have confidence in it, and you can, too. For full information write Scintilla Division, The Bendix Corporation, Sidney, New York.



rg type FS-1312-HSC 4-cycle, Su



Scintilla Division



Export Sales & Service: Bendix International Division, 205 E. 42nd St., New York 17, N. Y.

KOPPERS

on-the-spot availability of rings keeps your lines "on stream"



Dependable performance in all oil and gas applications

Koppers Piston Rings are now available in the field in a complete range of materials and a wide selection of types and sizes for every application in the oil and gas industry.

To gain trouble-free performance, lower operating costs and less frequent down-time, select Koppers Piston Rings—the choice of many original equipment manufacturers.

Koppers Piston Ring dependability, in even the most rugged applications, is backed with 38 years of experience in manufacturing rings of predictable performance.

If you have a ring problem, consult your Koppers field agent or write: Koppers Company, Inc., Piston and Sealing Ring Department, 6209 Scott Street, Baltimore 3, Maryland.

Send now for Koppers recommended Piston Ring Set-Ups applicable to the engines which you operate.

KOPPERS Sales Office and Agents in these convenient locations:

Koppers Co., Inc. District Sales Office 318 N. Pearl St. Dallas 1, Texas

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Nolan Sales Corp. 421 N. Cincinnati St. Tulsa 20, Oklahoma

D. G. Silvey Co. 316 E. Kings Highway Shreveport, Louisiana

Sample Bros. 2010 Big Bend Blvd. St. Louis 17, Missouri

Sample Bros. 6315 Brookside Plaza Kansas City 13, Missouri



AMERICAN HAMMERED® INDUSTRIAL PISTON RINGS

Engineered Products Sold with Service



Power output of Richfield Oil Corporation's 2 cycle natural gas compressors has been economically increased 30-40 per cent by the AiResearch multiple turbocharger system...utilizing existing compressors, personnel and plant size.

At the same time, during the three years in which turbocharged units have been in operation, unscheduled down time and maintenance have been at a minimum.

In addition to long service life, the turbochargers in the AiResearch multiple system are smaller, easier to handle and less expensive to maintain or replace than a large turbocharger of a single unit system.

These rugged turbochargers have also accumulated many years

of proven trouble-free operation in a wide variety of the most demanding vehicular applications. Extremely simple in design and requiring no separate cooling system, they are another example of AiResearch leadership in the development and production of air-cooled turbochargers and turbocharger controls for all major engine applications.

Your inquiries are invited.



CORPORATION

AiResearch Industrial Division

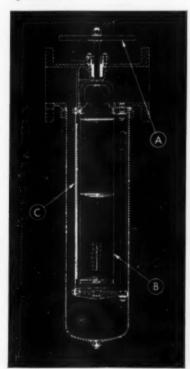
9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS



PERMANENT, UNINTERRUPTED ENGINE FILTRATION

CLEANING the Purolator Series G-144J Metal Edge Filter is done by an occasional twist of hand wheel (A). This rotates Metal Edge Filter Element (B) so fixed knife blade (C) shears waste off the element as it rotates. Accumulated waste is periodically removed through plug at bottom of case. If service requirements warrant, filter element can be rotated continuously by motor drive.



Designed for filtering fuel or lube oil, Purolator Series G-144J Metal Edge Filter will make your engine last longer.

Because it's made of preciselyspaced metal ribbon wound into cylinder form, the Purolator Metal Edge Filter element will last almost indefinitely.

Maintenance is negligible. An occasional twist of the hand wheel on top of the unit cleans the filter element...keeps it working at top efficiency. There's no need to cut off the engine, or to interrupt the flow of oil.

This filter can be installed on either the suction or the pressure side of the pump and includes a relief valve. Degree of filtration ranges from 25 to 500 microns to suit your fluid requirements. For

complete details, write Purolator Products, Inc., Dept. 4845, Rahway, New Jersey.

Filtration For Every Known Fluid

PUROLATOR

PRODUCTS, INC.

Rohway, New Jersey and Teronto, Ontario, Canada

Inland Waterway Map

Publication of the 1960 edition of the navigation map folio of the Intracoastal Waterway, Gulf Section, New Orleans to Port Arthur, has been announced by the Mississippi River Commission, Corps of Engineers, U.S. Army. This ninth edition covers the waterway from New Orleans, La., to Port Arthur, Tex. It also includes the Morgan City to Port Allen route with connection to Plaquemine, Atchafalaya River, Calcasieu River, and minor outlets to the Gulf of Mexico. The folio of maps is reproduced by black line photo-offset methods with overprinting in colors. It is to a scale of about one inch to one mile. In addition to 42 detailed maps, the folio includes 24 supplementary sheets showing sketches of bridges, locks, and port facilities, as well as other data relative to the waterways and rivers shown. The maps also show navigation lights and markers along with other information of importance to navigators. Copies of the folio may be obtained for \$1.50 from either the U.S. Army Engineer District, Foot of Prytania Street, New Orleans, La., or from the Mississippi River Commission, P.O. Box 80, Vicksburg, Miss.

Fuel Additive Brochure

Oronite Chemical Co. now has available a 13-page brochure describing its new diesel fuel additive, OFA 265. A six page supplement to the brochure is also available which gives additional details and statistics gathered in field testing. OFA 265, reports Oronite, "is the only detergent additive ever developed specifically for diesel fuels." It is a mixture of ash-free organic surface active compounds blended to provide protection from gums and rust on injection system parts. Properties of the diesel fuel additive as well as results of recent laboratory and field tests are fully detailed in the brochure and its supplement. To obtain a copy, write to Oronite Chemical Co., 200 Bush Street, San Francisco, California.

Injection Tube Data

Diesel fuel injection tubing used for injection systems with working pressures from 3,000 to 9,000 psi is described in Data Memorandum No. 10 published by Superior Tube Co., Norristown, Pa. Produced from seamless C-1008 and 4615 steel tubing which has had the inside diameter conditioned to remove fissures and other defects, the most frequently specified dimensions are: 1/4 and 5-inch od and .058, .067, .093, .125 and .135 in. id. According to the memorandum, tests and inspections assure a smooth bore of accurate size with no fissures, crevices, or other imperfections deeper than .005 in. or 5 per cent of the

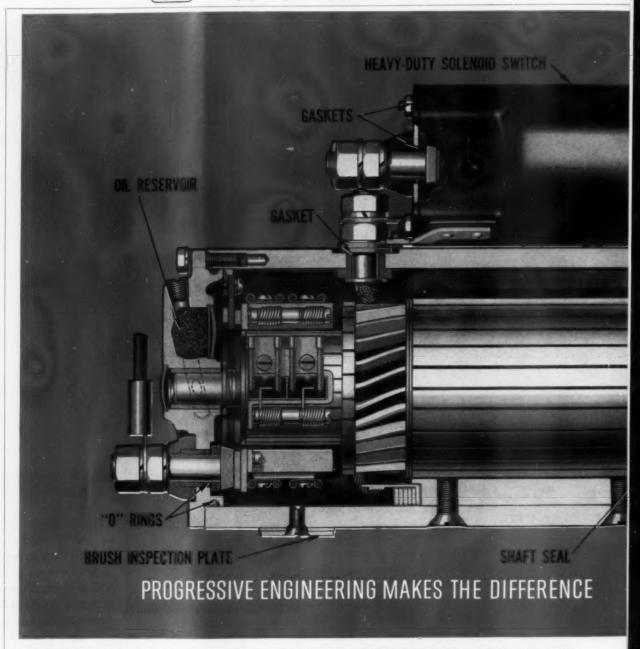
wall thickness, whichever is less. Superior hydrostatic pressure tests all fuel injection tubing to 5,000 psi. The data memorandum lists the mechanical properties of both C-1008 and 4615 tubing supplied in this temper. Copies of Data Memorandum No. 10 can be obtained by writing to Superior Tube Co., 1774 Germantown Ave., Norristown, Pa.

(ITS NEW)

Engine Testing Supervisor

Appointment of Donald R. Vance as supervisor of Perfect Circle Corporation's Engine Testing has been announced by W. B. Prosser, president of the piston ring manufacturing firm. The appointment makes Vance responsible for verification and testing of original equipment piston ring applications

using customers' own makes of engines. The PC engine testing program also researches piston ring, cylinder bore and associated problems of engine manufacturers and after-market users. Prior to joining Perfect Circle, Vance was quality control manager for Stewart Warner Corp., and was formerly a product test engineer with International Harvester.



NEW DELCO-REMY HIGH-OUTPUT MOTOR

Delco-Remy now offers a completely new series of solenoid-operated, over-running clutch type heavy-duty cranking motors. These versatile high performers are designed and built to furnish the torque and speed necessary to crank heavy-duty engines on 12-volt systems. This 12-volt motor will do the same job as a 24-volt motor of equal size when supplied with the same battery power. Seriesparallel switches and the complicated wiring are eliminated on engines up to 900 cubic inches. Special two-piece drive housings can be assembled to permit a total of 24 different solenoid positions for extreme versatility of motor mounting. New 50% longer brushes, together with sealing rings (optional) and large oil reservoirs (optional),

assure extra-long operating time between overhauls.

TOTALLY ENCLOSED DRIVE SHIFTING MECHANISM is protected against dirt, water, slush and ice. This enclosure, plus the shaft seal and linkage seal, also prevents transmission oil leakage.

TWO-PIECE DRIVE HOUSING DESIGN permits 24 different solenoid positions. Nose housings are available in S.A.E. #2 and #3 mountings.

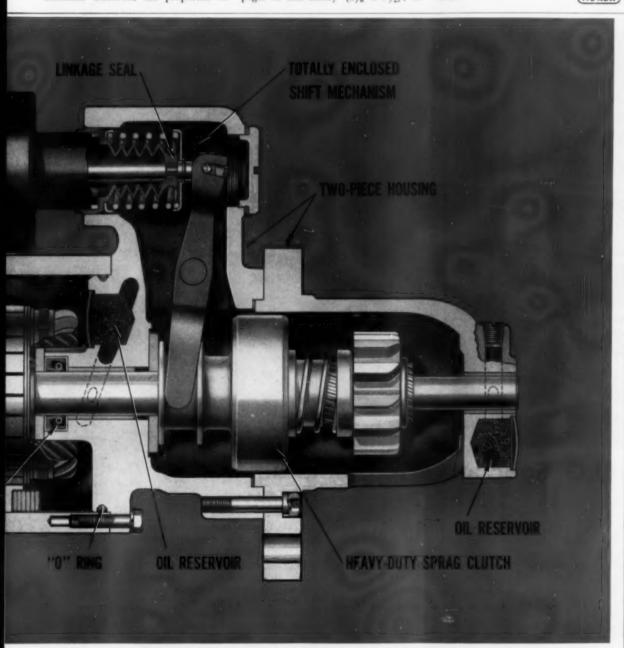
HEAVY-DUTY SOLENOID AND SWITCH provide positive pinion engagement and safely handle maximum starting current. Special seals increase contact life.

Vest Pocket Reference

An engineer can't carry in his head all the information he has ever learned. but he can carry in his pocket all the information crammed into the Engineer's Vest-Pocket Book. And what a mass of information there is. Whether he is looking for the formula for the Binomial Theorem, the properties of

structural steel, the strength of gear teeth, the properties of saturated and superheated steam, the resistance of immersed body moving through fluid, thermal stress, resistance, verniers, cost estimating, properties of minerals, chemical solubility, or any of the other 250 main items and 47 important charts, he will find the information, in the 192 pages of this handy (25% x 51/2), informative book. There is an alphabeti-(ITS NEW)

cal index, an index of charts and tables. as well as 12 marginal indexed headings: Mathematics, Building, Mechanics, Heat, Hydraulics, Pipes, Electricity, Surveying, Costing, Mining, Chemistry, and Miscellaneous Data. The book is published by Ottenheimer Publishers, Inc., 4805 Nelson Avenue, Baltimore 15,



ELIMINATES SERIES-PARALLEL SWITCHES

SPRAG CLUTCH DRIVE operates with non-chamfered ring gear. Pinion indexes on spiral spline, positively engages ring gear before power switches on, and become disengaged with sporadic engine firing.

HEAVIER BRUSH INSPECTION PLATES resist damage from use and handling—are sealed to prevent leakage to motor interior.

Engine manufacturers are invited to write directly to Delco-Remy for complete information and engineering assistance on the specific application of these new motors. Fleet owners will find this motor available through their truck dealers.

Delco-Remy

electrical systems



DELCO-REMY . DIVISION OF GENERAL MOTORS . ANDERSON, IND.

ADS Directory

A new edition of the membership directory of the Association of Diesel Specialists has been released according to an announcement by Mr. S. E. Franklin. secretary of ADS and president of Diesel Control Corp., Wilmington, California. In addition to the listing of the regular Service Members, the directory also provides listings in the following classifications: manufacturer members; associate manufacturer members; honorary members; charter members; and associate members. Mr. Franklin also points to the availability of a companion booklet, "What Can The ADS Do For You," containing concise statements about the functions of the Association and the services members render in the industry. A free copy of either booklet can be obtained by writing to Mr. S. E. Franklin, Diesel Control Corp., 226 North Marine Avenue, Wilmington,

New Treasurer

The appointment of Forest D. Richardson as treasurer in charge of finance and business administration of the Young Radiator Co., Racine has been announced. Immediately prior to his appointment at the Young Radiator Company, Richardson was general manager of administrative services at Good-All-Electric Manufacturing Co. in Ogallala, Nebr.

Petter Division Manager

In order to strengthen their small engine organization, Mr. Tom Love has been appointed manager of the Petter Division of Hawker Siddeley Brush, Inc. He will be responsible for the distribution and stocking of engines and spare parts and the assembly of generating sets and engine driven compressors. Mr. Love has been with the Petter organization since 1936 and joined the United States Branch in 1951. For the last two years he has been in charge of the company's West Coast branch and on his return to New York, he now takes over responsibility for small engine sales throughout the United States.

Midwest Tech-Service Center

Establishment of a branch office and technical service center at 2645 West Peterson Ave., Chicago is announced by The Alpha-Molykote Corp., Stamford, Conn., producer of molybdenum disulfide specialty lubricants. R. B. Dost, formerly President of R. B. Dost, Inc., Chicago, has been named Midwest District Manager. The new technical service center will provide expanded engineering assistance in the solution of lubrication problems to industry in the Midwest.



RPM DELO Special Oil protects so well... trucks work 25% longer before overhaul

Wagner Transportation Co., Twin Falls, Idaho, used to schedule engine overhauls for its over-the-road diesel tractors at 200,000 miles. After changing to RPM DELO Special Oil, however, engines dismantled at this interval showed so little wear . . . were in such good condition throughout . . . that overhaul period was extended to 250,000 miles.

"RPM DELO Special Oil does the best job of any oil we've ever used," says Wagner's Master Mechanic, Ike Rile.

"We've used it since 1952 . . . have yet to find a stuck ring. It holds down engine wear, eliminates sludge and varnish...oil consumption is moderate, too! We've tried competitive oils but in our opinion there's no comparison."

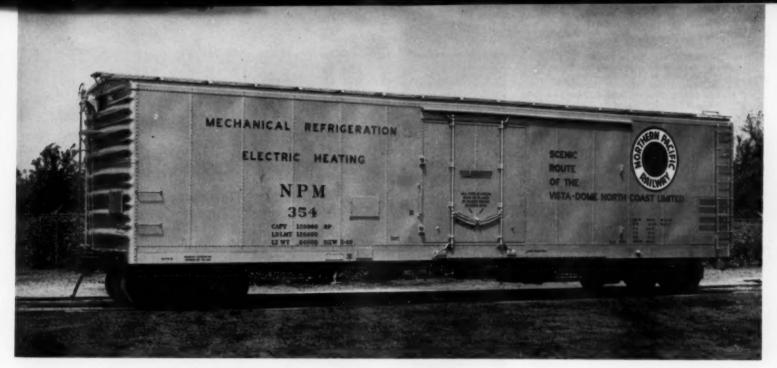
Hauling livestock, produce and general freight, Wagner Transportation Co. rigs operate throughout the West in every sort of temperature extreme . . . travel close to 21/2 million miles per year. Present fleet includes 10 Whites and 10 Kenworths.

RPM DELO Oil reduces wear and prolongs engine life because it clings to parts whether the engine is running or idle... hot or cold. Piston rings stay free because an anti-oxidant fights gum and lacquer formation and a special detergent keeps parts clean. Other additives prevent corrosion of bearing metal and crankcase foaming.

Why not try RPM DELO Oil? Chances are it can cut your costs, lengthen equipment life. Just call your local representative or write any company listed below:



STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20 . STANDARD OIL COMPANY OF TEXAS, El Paso THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey . THE CALIFORNIA COMPANY, Denver, Colorado



One of the new Northern Pacific reefer cars. The wide louvres at extreme right provide air to diesel unit. Access door is on other side of car. Fuel tanks beneath frame carry fuel for about 500 hours of operation.

MORE DIESEL REEFERS FOR RAILROADS

By ELTON STERRETT

ECHANICAL refrigeration, to replace manual icing of cars for transportation of frozen or perishable foodstuffs, is another of the strides railroads are taking to speed up and make more dependable their service to shippers whose wares must be protected by cooling and, on occasion, from becoming too cold during mid-winter transit in frigid zones.

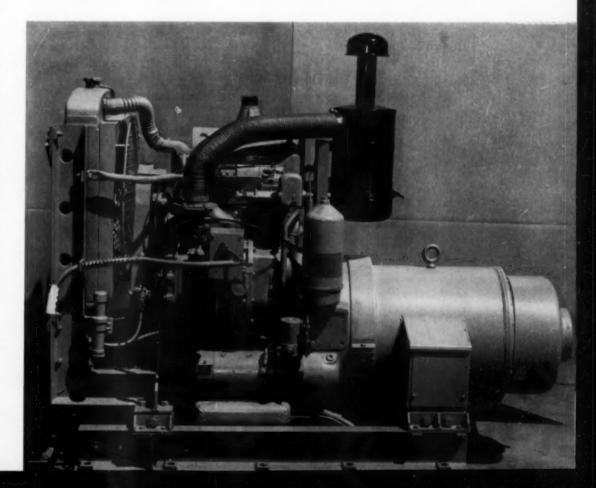
One of the reefer systems finding high favor with the railroads is that in which either Trane or Carrier units provide the temperature control. The power unit, developed by Stewart & Stevenson Services, Inc. of Houston, utilizes General Motors diesels equipped with auxiliaries to adapt them to the specific needs of railroad car mounting. These S & S diesel units are now in service or being installed for two large operators of refrigerator car fleets, Pacific Fruit Express and Northern Pacific, with an order for 400 units recently placed by Santa Fe railroad.

Diesels used on the PFE reefer cars are GM model 2.53 with bore and stroke of $3\frac{7}{8} \times 4\frac{1}{2}$ in. The engine on the PFE cars is arranged for two-speed operation. The rating on the Delco generator on

View of left side of GM model 2-71 diesel unit installed in NP cars, showing connection between radiator and engine and flexible metal tubing from Donaldson air cleaner to inlet of Roots blower. The rectangular tank below starter motor is lube oil sump tank.

this installation for the 1200 rpm, 60 cycle speed is 12.5 kw. For the 800 rpm, 40 cycle speed the rating is 8 kw. The corresponding rating of the 2-53 at 1200 rpm is 25 hp and the actual load imposed by the refrigerator system is 19 hp or a

load factor of 75 per cent. At the 800 rpm speed, the rating is 17 hp with a load of 12 hp imposed by the reefer system on a load factor of 75 per cent. Thus the 2-53 engine is adapted to the load for two different speeds which results in long life



Two speed power unit is installed in Pacific Fruit Express cars. Engine is GM model 2-53 with Delco generator. Lever running from front of radiator is for starting. Farr dry type air filter is used on this model.

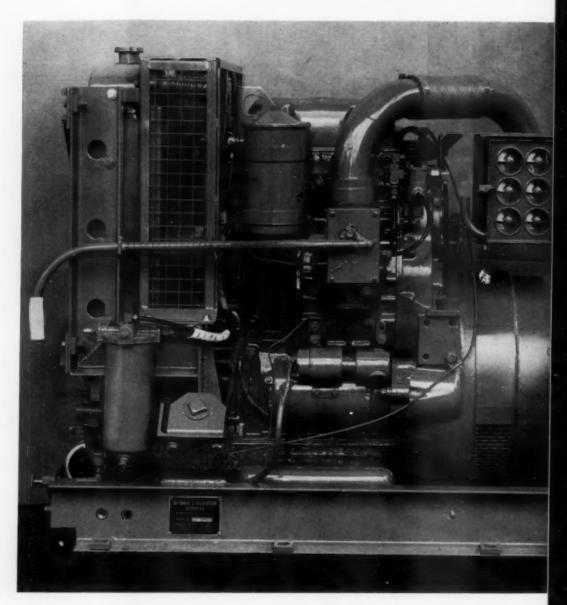
with good fuel consumption throughout the required operating range.

The Northern Pacific cars are installed with systems utilizing GM 2-71 engines set to operate at a single setting of 1200 rpm. The 2-71, with bore and stroke of $41/4 \times 5$ in., drives a 20 kw Delco generator and the corresponding engine horse-power rating is 34 hp with a load of approximately 30 hp imposed by the refrigeration system when operated under absolute maximum conditions.

Equipped with a 12 volt starting battery and auxiliary cold weather starting aid, the engines are put on the line through a single control handle with a push button switch for the battery circuit at its outer end. The refrigerator unit is installed in one end of the reefer car in a section apart from the cooled cargo space. Cold air is circulated through the car lading via ducts in car roof and walls and returned to the chiller for re-cooling. In the 2-53 units, in which two operating speeds are provided, the 1200 rpm speed is employed until the interior of the car and its contents have been brought down to the desired temperature, after which an automatic control slows the diesel to 800 rpm and the current frequency changes from the initial 60 cycles to 40 cycles. Hydraulic controls on the governor maintain the engine at the rated speed for either frequency.

The Northern Pacific Railway installs the 20 kw,





60 cycle, 230 volt units in its cars, voltage regulation being inherently built into the generator used. These systems furnish power to a Carrier 10 ton refrigeration system having a 15 hp drive motor.

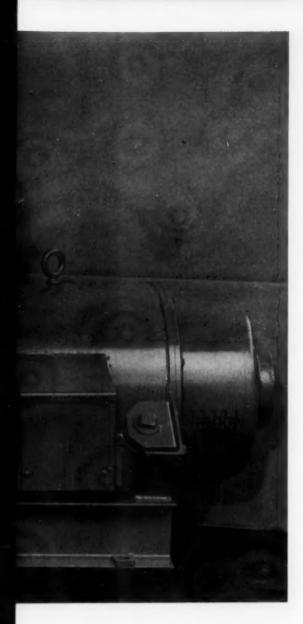
The Pacific Fruit Express utilizes the 2-53 engine with two-speed control to effect fuel savings and extend the service life of the unit. In these cars refrigeration is provided by a Trane 10 ton compressor-condenser assembly with completely automatic controls. The system also provides electric heating for cold winter months or crossing snowcapped mountains. Both power unit models are equipped with Stewart & Stevenson shutdown systems which stop the diesel in case of high jacket water temperature or low lubricating oil. Each of these conditions, as well as low fuel supply, will actuate a corresponding "flag" in a small case mounted alongside the engine, indicating the cause of the stoppage and enabling the service man to take the necessary action without having to run the starting motor unnecessarily, and thus

> Looking down on an NP unit installed in the car. Cabinet at right of motor houses electrical controls. Insulated exhaust line connects with vent in car roof. Space is ample for checking and servicing. Generator is 20 kw Delco and air cleaner is Donaldson.

deplete the storage battery. The flags are automatically reset, mechanically, as conditions are returned to those for normal operation. The exhaust is led upward through the car roof, after passing through high degree spark-arresting muffler.

The power lead between the direct-driven generator and the compressor motor is brought around to the front of the radiator, and terminates in a receptacle. When standing in a station or in a populated area where the exhaust might prove a nuisance and where the usual circuits are available for car lighting and power, the refrigerator units can be driven without use of the diesel engine. Voltage and frequency requirements of the motors are such that commercial current will serve when available. The engine is fully pressure lubricated, circulation being effected with a positive displacement gear-type pump, integrally mounted within the engine base. Lube oil capacity includes a 20 quart sump, a bypass relief valve protects the unit from excessive pressures.

The fuel oil system includes a fuel oil transfer pump, having a maximum lift of six feet from fuel tank to diesel. Primary and secondary replaceable element type filters are used between this pump and the injectors. The engine-driven



Louvred door at end of PFE reefer car provides access to unit, admits combustion air for engine. Note small engine compartment required.

fuel oil supply pump is of the positive displacement type and is equipped with bypass valve for relieving excess oil pumped over engine demand. Both primary and secondary filters are located at the front of the radiator mount, within reach of the operator while standing on the ground—eliminating the necessity for entering the cubicle.

Unit type fuel injectors are standard, the injector on each cylinder timing, metering, pressurizing and atomizing the fuel as it is forced into the combustion chamber. This set-up requires no central metering or pressurizing pump, and allows use of flexible nylon fuel lines throughout, as lines are not subjected to high pressures which might subject them to rupture in service. All engine auxiliaries are also mounted on the left side, enabling the engine to be set close to the end of the car, and conserving remaining cubicle space for servicing the entire unit.

The cooling system is designed to maintain desired engine temperatures while the ambient temperature in the cubicle may vary between -30° F. and +150° F. The pressurized cooling system is charged with a mixture of 50 per cent water and 50 per cent ethylene glycol base anti-freeze. Cooling capacity is such that five quarts may be evaporated before the automatic protective device will operate to shut down the engine because of high operating temperature.

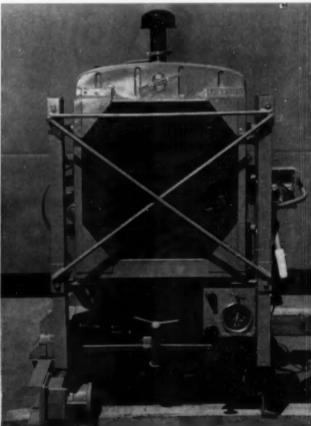
The engine is mounted on special brackets to eliminate direct shear on the tie-down bolts between engine base and structural steel sub frame. Bracing of the radiator frame and shell is ample to withstand shock, while use of flexible fuel, oil, air and exhaust piping provides a margin of safety to carry all these lines well past the specified maximum. When setting up the first of a long line of such units, Stewart & Stevenson tested the units by allowing a wrecker's ball or "skull" to swing through an arc which would give, at impact, the effect of a 15 g shock on the engine mounting. Following such tests, it was evident the diesel and its accessories would remain in position and functioning, no matter how severe a shock the refrigerator car sustained in service.

The battery is maintained at full voltage by a rectifier which takes a small current from the ac generator and passes a dc component to the battery. Diesel fuel is carried in dual 250 gallon tanks slung below the car floor—enough for 20 days at full load. A fuel suction and return line leads through the floor to a spot near the supply pump.

The diesels and refrigeration components are designed for 1200 hour operation between servicings, or at intervals determined by the hours the reefer is actually carrying cargo to be refrigerated, and further depending upon whether it is frozen foods to be kept at zero temperature, or fresh fruits and vegetables to be transported with the temperature setting up to 34° F. Pinpoint regulation of the temperature at the predetermined level reduces dehydration of fresh foods. Automatic defrosting of the evaporator coils in the cooling unit is started when the accumulation of ice causes an air pressure drop, across the evaporator coils and an air flow switch sets up the defrost cycle, which normally requires about 30 minutes. The unit then resumes its refrigeration routine, the short defrosting period having affected slightly, or not at all, the temperature of the reefer car and cargo.

Radiator mounting on NP unit, with cross bracing and shock absorbing inserts between shell and supporting frame. On base at left is receptacle for connecting to outside power, at right is trouble indicating panel.





NEW YORK CITY'S FIFTH SLUDGE VESSEL

283 Ft. Bowery Bay With Two 930 HP Cooper-Bessemer Diesels Is Most Powerful in Fleet

By DOUGLAS SHEARING

HE Bowery Bay, a sludge vessel owned by the City of New York's Division of Sewage Disposal, is completing its first year of service for the department. The Bowery Bay was the fifth vessel to join the city-owned fleet engaged in carrying raw and digested sludge from sewage treatment plants to a discharge area about 12 miles to sea. Main power for the newest vessel is supplied by a pair of Cooper-Bessemer LS-6-DR diesel engines.

The Bowery Bay was designed by Philip L. Rhodes. New York naval architects. The vessel differs from others in similar service for New York mainly by installation of a more powerful engine, installation of permanent pumps for pumping sludge from ship to shore and provision for washing out tanks via a built-in flushing system. Overall length is 283 feet. Beam is 45 feet and design draft is 12 ft. The Bowery Bay can carry cargo deadweight capacity of 1899 tons and total volume

of the sludge compartments is 68,500 cu. ft. Speed is just over 12 knots. Personnel consists of 12 officers and crewmen.

The hull has a raked stem, cruiser stern and is subdivided into seven watertight, transverse compartments by six main bulkheads extending to the main deck. A centerline bulkhead extends through the full length of the sludge compartments. Compartments consist of forepeak, forward hold, three pairs of sludge tanks, machinery space and aft peak. Fuel oil is carried in wing tanks forward of the engine room and ballast tanks are located forward and aft on the vessel.

The two main propulsion engines, Cooper-Bessemer LS-6-DR models, are four cycle, six cylinder units with bore and stroke of $151/2 \times 22$ in., each developing 930 hp at 330 rpm with bmep of 88 psi. The engines are single acting, direct reversing and

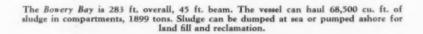
naturally aspirated and are equipped for air starting at 250 psi pressure from two compressors.

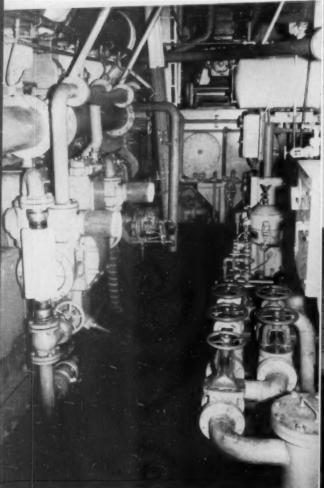
The LS-6-DR's are direct connected to the propeller shaft and each engine drives a specially designed Ferguson solid bronze three-blade propeller of 6.75 ft. diameter and 4.69 ft. pitch.

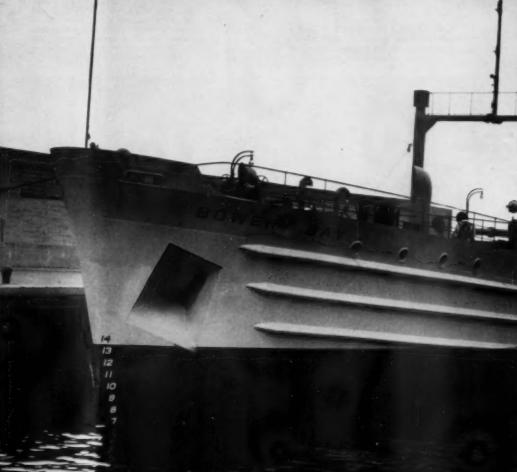
Electricity for ships service and auxiliary, including sludge pumps, is supplied from two Allis-Chalmers diesel generating sets. The sets, model 6DA-970, consist of a six cylinder diesel engine driving a generator with 75 kw output at 440 volts, 3 phase, 60 cycle. Engines and generators are mounted on common welded steel base. Emergency electricity is supplied by an Allis-Chalmers DA-11AB set rated 10 kw, 120 volt, 3 phase, 60 cycle.

The main engines are fresh water cooled through shell and tube heat exchangers with salt water

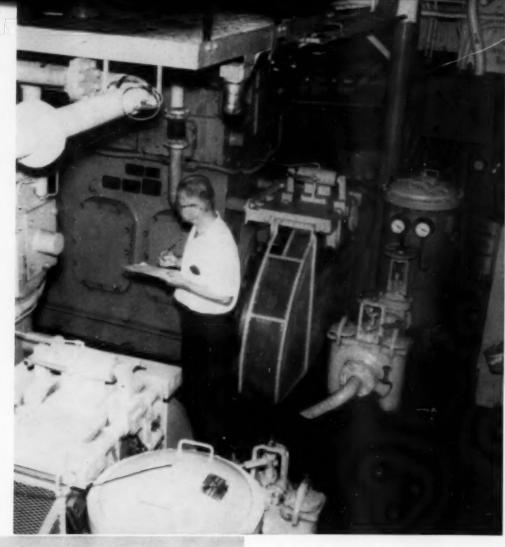
Port Cooper-Bessemer engine, outboard side looking aft. Note DeLaval Separator fuel centrifuge.

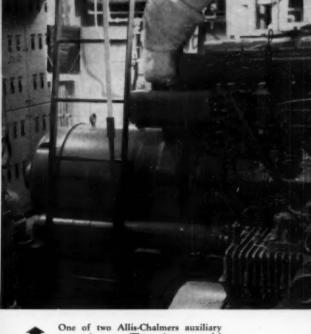






DIESEL AND GAS ENGINE PROGRESS







Engine room looking to port. Main engines are Cooper-Bessemer model LS-6-DR, naturally aspirated 6 cylinder units rated 930 hp each at 330 rpm. Flywheel brake by Westingshouse Air Brake is shown immediately in front of CFC lube oil filter.

The Bowery Bay can also discharge its cargo ashore for land fill, conditioning and reclamation purposes. This is done by taking suction on a 14 in. line running from forward under the sludge deck into which each tank can be discharged through a 10 in. valve. Forward of the engine room this header is connected to two 2000 gpm pumps which discharge into the filling line on deck and thence through the filling hose to shore. Motors driving the pumps are separated from the pumps by a gas and water-tight bulkhead and are located in the forward end of the engine room. Another innovation of this pumping installation is the ability to wash grit from each tank. The sludge pumps, when connected in series, can take sea water via a nearby sea chest and discharge at 1250 gpm at 50 psi into the filling line, and thence into each tank through a 6 in. line, and sprayed over the bottom and sides through 24 bronze nozzles.



Main engines (2)	Cooper-Bessemer
Overspeed governor	
Compressors	Quincy
Air Intake filter	Air Maze
Lube oil	Gulf
Exhaust muffler	Burgess Manning
Fuel, lube oil purifiers	
Propellers	Ferguson
Fuel oil filter	
Lube oil filter	. Commercial
Engine alarm	
Heat exchangers	Ross
Diesel generator sets	Allis-Chalmers

and fresh water pumps mounted on the main engines. The generator engines are fresh water cooled with piping arranged to facilitate cooling with sea water. Two fire and general service pumps serve as standbys for the engines fresh and salt water circulation. Lubricating oil is circulated by engine attached pumps with a motor driven standby. All lube oil is full-flow filtered.

Loading time for the *Bowery Bay* averages 11/2 to 2 hours at each of the treatment plants. The round trip to the dumping area totals about 70 mi. from the Wards Island plant and requires 6 to 7 hours and 50 mi. from the Owl Head Dock, which takes 4 to 5 hours.

Sludge is put aboard the vessel by gravity feed from land-based storage tanks through a pipeline discharging to the vessel through 10 in. flexible hose connections. The flexible connections allow filling to continue without interruption due to rising or falling tide. The main deck filling line of 14 in. diameter is controlled by a gate valve to suit draft and trim of the vessel during loading.

When the vessel is light the sludge deck is 9 in. above the waterline at lowest position. Dumping at sea is by gravity through twelve 18 in. valves set into the sludge compartment bottoms and actuated from the main deck by a hand wheel. Dumping at sea takes from 10 to 15 minutes and the raw water circulation to the main engine heat exchangers is shut off during this time to prevent fouling. Cooling water is recirculated from the aft peak tank during this period.



IOWA UTILITY INSTALLS 2000 KW PEAKING PLANT

Iowa Electric Light & Power Co. Installs Electro-Motive Division 2000 KW Dual Fuel Power Plant to Protect \$17 Million Laboratory and Provide Daily Peaking Service

O meet two specific objectives, both based on reliability and economy of operation, the Iowa Electric Light & Power Co. has placed in service a fully automatic-remote controlled 2000 kw dual fuel power plant near Ames. The plant, built by Electro-Motive Division of General Motors, is installed primarily to protect the new \$17 million Department of Agriculture Animal Disease Research Laboratory by providing emergency power within seconds of any disruption of normal electric service. It will, in addition, provide peaking capacity on the company's system.

Before describing the Electro-Motive plant in detail, let's take a look at the circumstances that dictated its installation. Most important is the fact that due to the nature of construction and the type of experimentation to be carried on at the new Research Laboratory, the facility had to be guaranteed a continuous supply of electricity. Failure of supply could easily destroy 10 or 20 years of research. Also important, while it was possible for I.E.L. & P. to build new transmission lines from its Nevada substation and provide power from that location, construction costs were high. Even with double 34.5 kv loops to the laboratory through either Boone or Nevada, electrical power could still not be absolutely guaranteed. Thus the decision for putting generating equipment right on the spot and with its installation on the laboratory grounds, I.E.L. & P. has accomplished four

- 1. insured absolute continuity of service
- provided capacity on an average of 15 hrs./ day to the system.
- 3. deferred future substation construction costs;
- reduced the cost of transmission lines to the site.

By installing the 2000 kw peaking plant and building substation facilities at the laboratory site I.E.L. & P. feels it has economized in another way. Since a new substation would be required at the site to step down the 34.5 kv loops either from Boone or Nevada, he use of the dual fuel diesel peak shaver allowed them to utilize one substation both ways: step down to lab voltage from 34.5 kv and back to 34.5 kv when the plant was in peaking operation.

In its system, I.E.L. & P. can operate a diesel plant for several hours more economically than steam. Even for generation up to 15 hours a day, the use of natural gas in the dual-fuel diesel peaking plant still is the most economical procedure. Since natural gas is available throughout most of Iowa, these diesel peaking plants can be utilized economically in inaccessible locations, at the end of long transmission lines, or when an industrial customer sprouts up. The Ames plant can be enlarged from 2000 kw to a total of 5000 kw dual-fuel capacity if the need arises, and the plan can further be increased to 8000 kw by a combination dual-fuel plus straight diesel operation.

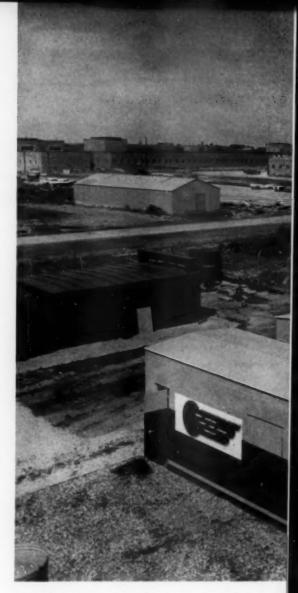
Here's a description of the Electro-Motive MU28-DF plant which will be operated about 15 hrs. daily, normally from 7 a.m. until 10 p.m., at least five days a week. The plant consists of two generating units and one control station, individually housed, which provide 2000 kw on 3 phase, 60 cycle, 4160 volt generation. The prime mover of the generating units is the General Motors 567C dual-fuel diesel engine with 16 cylinders of 81/6 in. bore and 10 in. stroke developing its rated 1000 kw capacity at 720 rpm. The engines operate on 94 per cent natural gas and 6 per cent diesel fuel driving an EMD model A11, 1250 kva alternator and static type magnetic amplifier exciter. The fuel, lubricating oil and closed engine cooling systems are totally complete within the units. A 15 kw immersion heater, thermostatically controlled, utilizing bus power and complete with lubricating oil and engine water circulating pumps is supplied for all-weather operation. Control and battery interconnections are made at a terminal board.

The peaking plant control station includes generator control, switchgear, automatic synchronizing and loading controls, starting battery and charger and power take-off connections. It is supplied with two sets of dead-front, metal-clad switch-gear with provision for third or fourth sets. The control station utilizes two horizontal drawout 250 mva air circuit breakers and potential pull-down type transformers. A single set of metering equipment including ac voltmeters, ac ammeter, kw-kvar meter and frequency meter may be assigned to either the bus or each of the two power units by means of a kw switch. Station output is recorded by means of a kw hour meter and 21/2 element metering is used for the kw-kvar and kw hour meters. The voltage regulator used is of the magnetic amplifier type.

The peaking plant's automatic control system, on receipt of a local or remote starting signal, will start, synchronize with the existing bus and load

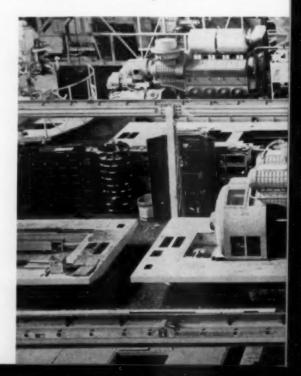
> One of the two 1000 kw dual fuel engine-generator units during final assembly at Electro-Motive's LaGrange, III. plant.

DIESEL AND GAS ENGINE PROGRESS



the individual generating units in sequence. The generators are protected against external faults by voltage restraint overcurrent relays and against internal faults by a combined bus and generator differential relay arrangement. Protection is also provided for generator overvoltage, overcurrent, field failure and reverse power.

The most interesting facet of the new Iowa Electric Light & Power automatic peaking plant, and a most vital factor, is its capability for deadline





the half minute, the engines start automatically and come to full speed immediately. If both high lines are out, a second automatic system signal closes the power plant's breakers and the units take the full load. Following the first indication of an outage, if either of the \$4.5 kv lines hold, the peaking plant continues to run at full speed for three minutes then shuts down automatically.

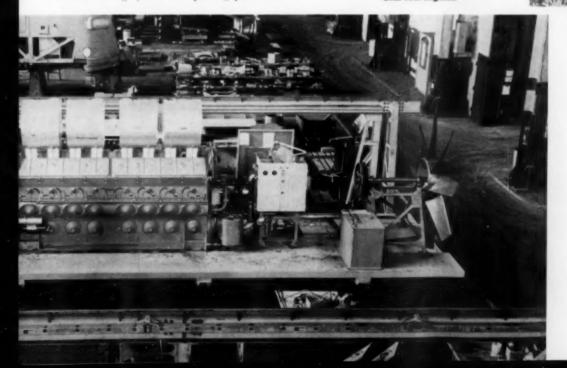
When the high lines are restored following an outage, the EMD plant automatically re-synchronizes under load with the system, then converts itself back to a peaking operation and runs until shut off by remote control signal from Boone, 20 miles away. No operator signal is needed during the dead load sequence; however, a leased-line pulsed

emergency operation. Here is the sequencing that occurs automatically, without a signal or control from any operator, should there be an emergency in connection with the government laboratory:

If an outage occurs on the utilities' 34.5 kv south line from Nevada (which normally feeds the laboratory site), an automatic throwover switch transfers to the north line. If the north line fails to hold, an automatic system signal activates a 30 second waiting cycle in the peaking plant. After Here is the 2000 kw dual fuel power plant installed at Ames, Iowa with the Department of Agriculture's Animal Disease Research Laboratory in the background. Plant is remote controlled and operates unattended providing daily peaking service, plus essential standby protection for laboratory.

At the dedication ceremonies held July 8th near Ames, this dial transmitter was used to start the plant's dual fuel engines.





signal from Boone is used to put the plant into normal peaking service.

Being a dual fuel unit, the peaking plant can automatically switch itself to straight diesel fuel operation in case of low, or loss of natural gas pressure. Following return to normal gas pressure, the unit returns to dual fuel operation. Whenever the emergency dead load sequencing is activated, the peaking plant automatically switches to straight diesel fuel operation, and returns to dual fuel only when normal service has been restored. These capabilities are especially important since they give total reliability of generating capacity under all circumstances. Should electric power and natural gas supplies both be lost at the same instant, the peaking plant still can supply more than the 1700 kw preferred load to keep the vital research laboratory in operation.

OIL LEVEL REGULATION IN ENGINE AUTOMATION

By W. L. BODE

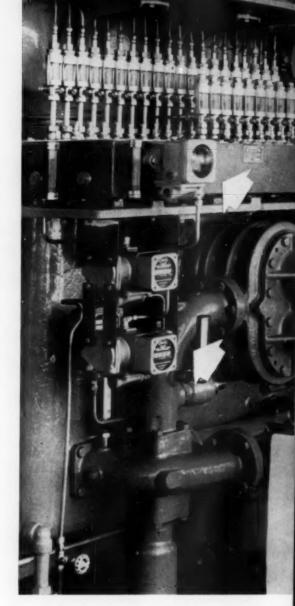
TARTING 13 years ago with their Ren oil level regulator, Power Plus Corporation has continuously expanded their line of Ren equipment to provide what they define as "Phase One" of engine automation. This is simply the elimination of daily attention required by an engine for the simple task of checking and filling engine lubrication and cooling systems.

Several important benefits can result from automating the lubricating oil supply aside from the obvious economy of the automation itself. Elimination of manual crankcase filling eliminates the almost universal tendency to over-fill crankcases and also eliminates the hazard of oil contamination which frequently results from manual filling. Maintenance of a low but safe oil level can result in substantial savings in oil consumption. Further, since engines are frequently scheduled for overhaul based on oil consumption figures, it follows that intervals between overhauls may be extended if oil concumption is reduced by the maintenance of an optimum oil level.

The Ren oil level regulator maintains the correct oil level in engine crankcases and lubricators, delivering oil as required by the engine from a supply tank. The regulator delivers only the amount of oil required by the engine.

The regulator body is a heavy aluminum casting with a quarter-inch thick plexi-glass sight window in the front of the casting to indicate visibly the accurate functioning of the regulator to show the oil level. To insure cleanliness of oil delivered to the crankcase, a fine mesh screen and sediment bowl are used. The regulator employs a ruggedly designed float which is insensitive to vibrations and, since the regulator valve is continually immersed in clean oil, wear and vibration considerations are eliminated. The centerline of the window is adjusted to the same level as the lube level to be maintained. The model RA regulator is intended for direct mounting through use of adapters on engine crankcases, using the pad originally provided by the manufacturer for sight level gauges. The model RA-LUB level regulator is applied to the side wall of force feed lubricators.

A general objection to the installation of individual supply tanks for each oil level regulator at each lubrication point in compressor plants and other multiple engine installations led to the development of the latest Ren automation product. The Ren Slow-Flow meter permits the use of a central oil supply system without sacrificing accurate measurement of oil consumed at each point of lubrication (crankcase and/or lubricators) automatically supplied by the oil level regulator.



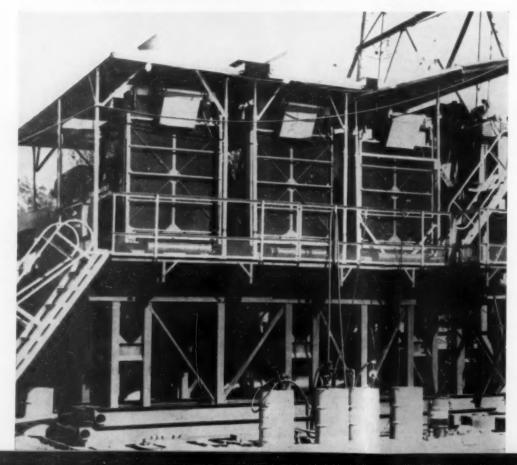
regulators (upper arrow) and three slow-flow meters (lower arrow).

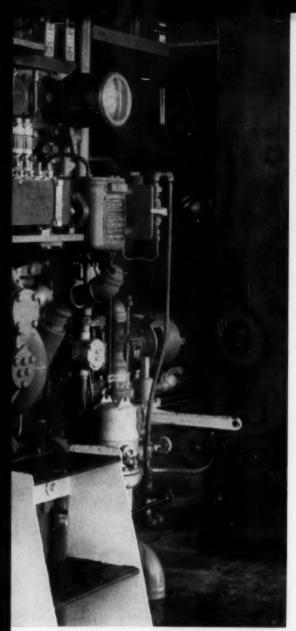
Colorado Interstate Pipeline Co. station is completely automated and re-motely controlled. Each of four Cooper-Bessemer compressor engines is equipped with three Ren oil level

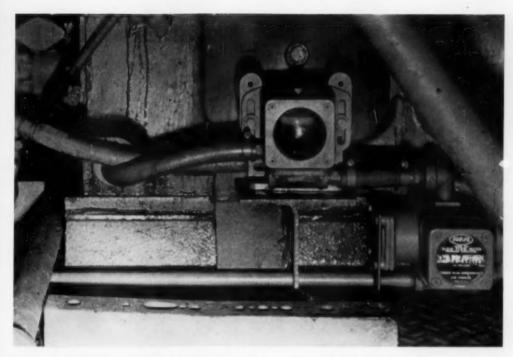
The Slow-Flow meter is designed for use with the oil regulator to accurately record oil being delivered to the regulator from the central supply system. The meter is designed for use on inlet pressure of from 2 to 40 lbs. A pressure regulator is built into the unit to regulate pressure for delivery to the oil level regulator. It is designed to meter oil makeup requirements and is not intended for quick refilling of crankcase or lubricators. However, SAE 30 lubricants at approx. 70° F. may be measured accurately in quantities up to 10 gph. The demand on the regulator normally determines the rate of flow.

A unique system of automatic cooling system water makeup for natural gas engines is achieved through the use of the Ren exhaust condenser. This unit condenses from a small portion of the engine exhaust gas an adequate supply of water which is automatically fed to the engine cooling systems as required. The condenser employs a primary purifying stage in which undesirable products of combustion are removed and discarded.

Model CDD Ren exhaust condensers atop radiators provide automatic pure water make-up on three VLROBU Waukesha engines on Jett Drilling Co. rig. These engines are also equipped with Ren oil level regulators for automatic lubricating oil make-up.







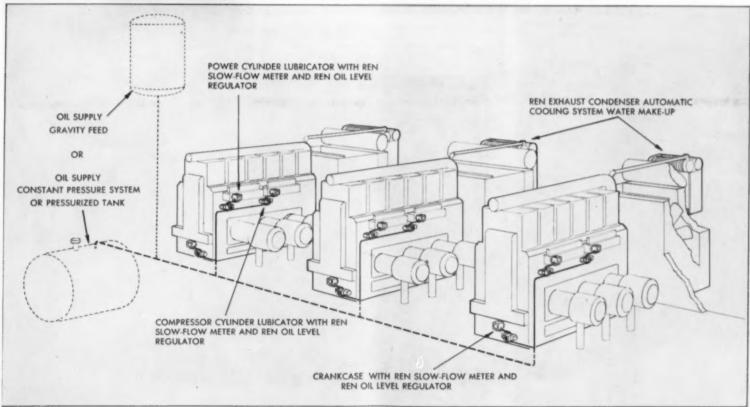
Slow-flow meter and oil level regulator shown on one of three Waukesha engines so equipped on Loffland Bros. diesel electric rig No. 46. Maintenance of the optimum oil level and accurate measurement of oil used can result in substantial oil savings.

The final stage of the condenser provides mineralfree water which is automatically fed to the engine cooling system as required.

For engines which operate continuously or nearly so, the automation provided by the Ren oil level regulator and exhaust condenser usually accomplishes all of the automation that is justified. However, where it is economically desirable to completely automate engines, "Phase One" automation is an important component to the overall automation package.

Twenty-five models of Ren exhaust condensers and oil level regulators are available for general and specific applications to all stationary engines used in oil field, pipeline, irrigation, generating equipment and other industrial uses.

Schematic diagram of typical compressor plant with Ren metered automatic oil supply and automatic cooling system water make-up.



FARM UTILIZES DIESELIZED PUMPS IN 200 MILE IRRIGATION SYSTEM

By ED DENNIS

around it than any other state in the union, yet it has more land under irrigation than almost any other Eastern state. In 1959, the state had about 602,000 irrigated acres with over 16,000 power units to control the water problem.

Tropical Farms is typical of the transformation taking place on Florida farms today. In the past the one-mule farmer hoped and prayed for favorable weather conditions and no frost during his winter growing season. But Tropical Farms has constructed a scientific system of over 200 miles of irrigation canals, some as deep as 12 feet and up to 30 ft. wide. These canals and ditches keep the pasture lands fresh and green all year round plus controlling the air temperature near the earth's surface in case of a frost.

In case of a threatening frost, pumps are started and the canal and lake water, which is always warmer than the atmosphere, is circulated around the fields of tender winter vegetables, thereby raising the temperature of air near the earth's surface above the freezing point.

One of the Cummins 175 hp diesel engines in the double pump house. These two pumping units control the water level in a ditched, diked 4,000 acre section. Also shown are the Gates "V" belts, Twin Disc clutch.

Tropical Farms is located near the southwestern end of what is known as the Central Ridge of Florida. South and east of Lake Placid the land starts to slope away from the hills, widens and flattens out. As the land tilts south and east, the lakes spill over making creeks, swamps and this area has some of the richest land in Florida, but usable only if under a water control project.

Controlling and conserving this water is a big and complex job. At Tropical Farms, they have installed about 20 dieselized pumping units which can pump a total of about 750,000 gpm of water.

Six Cummins dieselized pumping units were added last year to the farms irrigation system. The naturally aspirated model HR6-P Cummins diesel engines have a bore and stroke of 51/8 x 6 in., displacement of 743 cu. in., develop 175 cont. hp and drive Lennon 42 in. turbine (40,000 gpm) lo-lift irrigation pumps.

These dieselized stations and pumping units were especially designed and built for Tropical Farms by Jack Lennon of Lennon Pump Co., Lake

Placid. The pumps are constructed with an outside shell of ½ inch rolled ship plate, impellers are ½ to ¾ in. nickel steel.

A single pumping unit is mounted on a welded steel "I" frame and powered by a Cummins HR6-P 130 cont. hp diesel engine driving the turbine pump through Gates "V" belts and Twin Disc SP214 clutches. There is a 3 in. reduction from the primary pulley to the driven pulley. In the double pump houses, two Cummins HR6-P pumping units are installed with Lennon 42 x 48 turbine pumps. No mufflers are used on any of the installations. These double pump houses control the water level for a 4,000 acre section of ditched and diked land.

Since the first installation, eight years ago, there have been no major repairs needed on the 20 odd dieselized pumping units. Only minor adjustments, injector changes, etc. have been necessary. Lubricating oil and filters are changed every 100 hours.





DIESEL AND GAS ENGINE PROGRESS



Rugged mountain backdrop illustrates territory through which Interstate Motor Lines operates. Peterbilt tractor has Cummins turbocharged NH-220 engine. All of Interstate's OTR diesel tractors have Cummins units.

IML FLEET GROWTH PACED BY DIESELS

Salt Lake City Firm Typifies Importance of Good Fleet Maintenance Operations; Interstate Motor Lines Operates 225 Diesel OTR Tractors in Widespread Western Area

N issue after issue of this magazine we stress the importance and down right economic "horse sense" of establishing and maintaining good fleet maintenance programs. Out West, where it's a long ways from "hyar to thar," scheduled maintenance of over-the-road fleet equipment becomes even more important. A good case in point is Interstate Motor Lines, Inc., a common carrier based in Salt Lake City, Utah. We went to Fleet Maintenance Supervisor, Thomas "Joe" Carter, who's responsible for all of Interstate's on-highway equipment including 225 OTR tractors, to study his operation and report on his efficient maintenance program.

Before describing the program, it's important to gain some knowledge of how the fleet developed and its particular operating conditions. On August 23, 1929, Thomas S. Carter loaded and drove

> Central control dispatch boards at IML head office terminal at Salt Lake City is in constant touch with all firm's terminals. Cards record position of all tractors and trailers.

his first truck—an H-54 International with cable mechanical brakes—from Salt Lake City to Ely, Nevada, over an unmapped route of 238 miles. Today the company he started on its way over the lonely salt desert and sagebrush stretches of the

inter-mountain West, operates through a vast mountain and valley and plains territory reaching from the Pacific to the Great Lakes and Kansas City. The one-man, one-truck venture has grown into the 1,400 man 960-unit Interstate Motor Lines,





Thomas "Joe" Carter IML vice-president and Fleet Maintenance Supervisor Lon Adair examine a new addition, an International DCO-405 with Cummins turbocharged engine.

Note Winslow lube oil filter.

Inc., in which the public holds stock. And where that first haul yielded but a few silver dollars, the operation of 1959 produced net earnings of \$1,252,949 and gross revenue of \$20,054,625.

IML started joint-line operation to San Francisco and the West Coast in 1934. Permanent authority for direct operation followed soon and IML was able to give one-line service between the coast and Denver. In July, 1951, IML expanded operations to Chicago and in August, 1953 opened a quarter-million-dollar terminal in that city. In October, 1953 in cooperation with reliable interline carriers, IML launched regular-scheduled daily through trailer service, coast-to-coast. In Decem-



ber, 1955 IML acquired Airline Express, Inc., operating between Denver and Kansas City; in March, 1956 its purchase of Arrowhead Freight Lines, Ltd., operating between the Los Angeles basin areas to Salt Lake City and to Ontario, Oregon, was authorized; and in April, 1956 IML made its first public issue of capital stock, 50,000 shares of common. In 1958 IML acquired Morgan Truck Service, Boise, Idaho to Portland, Oregon.

Interstate claims the distinction of being the first motor carrier in history to provide a through

bill of lading with a through rate with provisions for central consolidation and directional loading of containers from Japan, Hong Kong and the Phillipines to consignees in America. This shippers' service was negotiated in 1957 when Interstate officials visited the Far East to work out the problems and organization to permit the better service package to American businessmen. The new form of distribution permits a shipper to compute delivered costs from point to point.

For some years two sons have assisted Mr. Carter

Type	t Number Truck Tractor.	-	ine Na Model	ke & HP	Transmission	Cluto	h	Rear	Arle	Front	Axle	Lube Oi	l Filter	Air Clean	er
678	IHC COE	Cummins	NH220	Turbo	Spicer 8125 12 Speed	Spicer	1419		Timken SQHD	FE900	Tinken	Winslow	8-937-0	Vortox C-	1406
1320	IHC COE	Cummins	NH220	Turbo	Spicer 8125 12 Speed	Spicer	14"		Timben SQHD	FE900 Timken		Winslow	8-937-0	Vortox C	1406
1018	Peterbilt Conv.	Cummins	NH220	Turbo	Spicer 8045 Spicer 8031G	Spicer	14"	Dual 6.17	Tinken SQM	FE900 Timken		Winslow	8-937-C	Vortox 55	6
	Kenworth Conv.	Summins	NH220		Spicer 8045 Spicer 8031	Spicer	14"		Timken	FE900 Timken		Luberfi	ner 750	Donaldson	A-1250
608	White COE	Cummins	MH220	Turbo	Spicer 8125 12 Speed	Spicer	14"		Timken	FE900 Timken		Winslow	2075-EC	Purolator	AF1012AA
262	Kenworth Conv.	Cummins	NH220		Spicer 8045 Spicer 8031G	Spicer	14"		Timken	FE900 Timken		Winslow	8-937-C	Donaldson	A-1250
968	Kenworth Conv.	Cummins	NH220	Turbo	Spicer 8041 Spicer 8031G	Spicer	14"		Timken	FE900 Timken		Winslow	8-937-C	Purolator	AF1012A
1342	Kenworth	Cummins	NH220	Turbo	Spicer 8125 12 Speed	Spicer	14"		Timken	FE900 Timken		Winslow	8-937-C	Purolator	AF1012A
	Peterbilt	Cummins	MI220	Turbo	Spicer 8125 12 Speed	Spicer	14"		Timken	FE900 Timken		Winslow	8-937-C	Purolator	AF1012A
1350	Peterbilt Conv.	Cummins	NH220	Turbo	Spicer 8041 Spicer 8031G	Spicer	14"		Timken	FE900 Timken		Winslow.	8-937-C	Purolator	AF1012A
1330	White COE	Cummins	MH250	Turbo	Spicer 8125 12 Speed	Spicer	14"		Timken	FE900 Timken		Winslow	8-937-C	Purolator	AF1012A



in his work as president and chairman of the board. Robert S. Carter is executive vice president and a director. Thomas "Joe" Carter is a vice president, fleet maintenance supervisor, and a director.

Interstate's fleet today numbers 512 trucks and tractors, of which 225 are diesels. The diesel lineup includes 93 Kents, 56 Petersbilts, 34 Whites, 31 International-Harvesters, 2 Macks, 6 Autocars and 3 Sterlings.

All of Interstate's diesel tractors are equipped with Cummins engines, most of them turbocharged NH-220's. The 51/8 x 6 in. bore and stroke NH-220 develops 262 hp at 2100 rpm in the turbocharged version and 220 hp at 2100 rpm in the naturally aspirated model. Tractor equipment has been pretty well standardized as far as transmission and suspension components are concerned, as can be seen from the equipment chart which accompanies this story. Over the road tractors average 250,000 miles a year while the short line trucks and tractors turn in an average of 175,000 miles a year to reach the fleet's total 25,000,000 mil./yr.

Interstate's units have long, tortuous runs through Western deserts and mountain ranges in every temperature. Salt Lake City to Denver round trip is 1,088 mi., and that's a short one. Here are a few other round trip figures from Interstate's route sheet: Denver-Kansas City, 1248 mi.; Denver-Chi-

Rebuilt Cummins NH-220 engines which have been run in on Clayton dynamometer are tagged by William Bird, in charge of IML's engine rebuild shop.



John Graham, shop foreman at Salt Lake City, inspects a Spicer transmission during 400,000 mi. "5-Check," which involves complete change of engine, transmission, air and electrical assemblies and accessory equipment.

cago, 2068 mi.; Salt Lake City-Chicago, 2890 mi.; Salt Lake City-Portland, 1632 mi.; Salt Lake City-Los Angeles, 1450 mi. The all-diesel long hauls average 5.173 mpg on trips from Salt Lake City and Denver to Chicago and 5.095 mpg from Denver westward. Two International Harvester diesel tractors used on short hauls average 8 mpg, "well above gasoline units on the same runs," according to IML. OTR payloads average 26,800 lbs. with gross load averaging 51,300 lbs.

These runs place a heavy demand on tractor and trailer and would put any maintenance department to the test. IML's maintenance men, led by fleet maintenance head, Joe Carter, have proved that top maintenance pays dividends. Proof of the importance of carefully planned maintenance: Interstate averages an impressive 334,792 miles between engine overhauls. The 147 engines in the fleet which have gone through the overhaul shop had been operated an average of 197,598 miles when these figures were compiled for DIESEL AND GAS ENGINE PROGRESS, and one of these had reached a lofty 456,500 miles. Figures like this are a tribute to good maintenance.

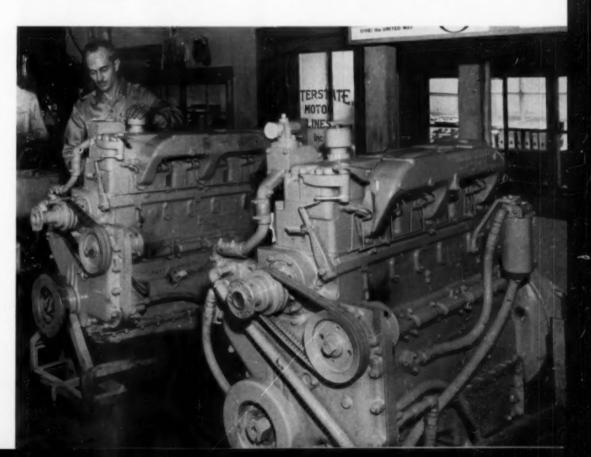
Maintenance procedures are outlined by Interstate in a seven-page form which lists steps taken in the every-trip "2 Check" inspection through the "5 Check" at 400,000 mi. The "2 Check" is primarily a chassis lubrication and safety check of equipment carried out before the start of a run. The "3 Check" (at 6,000 mi.) includes checks of running and electrical gear as well as lube oil changes (with Shell Rotella #30). In the 3-A check fuel injectors and valves are checked and adjusted and in Cummins NH engines with Winslow filters, engine lube oil is changed. The 40,000 mi. "4 Check"

list calls for inspection of electrical terminals and generators, compressors, radiator, and wheel bearings. Engine heads, liners and pistons are changed in the 200,000 frame overhaul. At this mileage too, camshafts, main and rod bearings are checked and replaced if worn and the main and auxiliary transmission and differential are changed along with the air compressor and oil cooler.

The 400,000 mile check, performed at the main Salt Lake City shop includes a complete change of engine, transmission, air and electrical assemblies along with all accessory equipment. Following this "5 Check" tractors are run in and tested on a Clayton chassis dynamometer.

Interstate's equipment maintenance costs came to exactly \$2,071,096 in 1959 and it is interesting to note the philosophy that guides the spending of this item, which amounted to just over \$1.00 for every \$10 of revenue earned by the firm in 1959.

"Preventative maintenance," says Joe Carter, "is a primary factor in controlling upkeep costs. The few extra minutes required to exercise preventative maintenance practices such as adequately anchoring all oil, fuel and water lines lengthens hose life enough to more than offset the additional labor costs. Tight nuts and bolts are a must at all times to insure longer life from frames, engines and component parts. Individual ideas on cam, valve, injector and fuel pump settings originate freely from interested drivers and from conscientious mechanics-but after all the facts and expectations are weighed, the 'old reliable' information must come from the engine manufacturer. The same interest and consideration shown any hard working employee should be shown the Cummins engines which comprise the major part of IML's fleet. Too much or too little fuel impairs the performance. Plenty of clean air is a must, along with cleanliness of the engine inside and out. Keeping the engine from overheating will help abolish early fatigue due to working the engine beyond its capacity."



NEW MENHADEN SEINER, SEA RANGER, IN SERVICE

Vessel Has Two Holds With Total Capacity of 750,000 Fish; Will Operate in Gulf of Mexico and Atlantic. Power is Supplied by Caterpillar Main and Auxiliary Diesel Engines

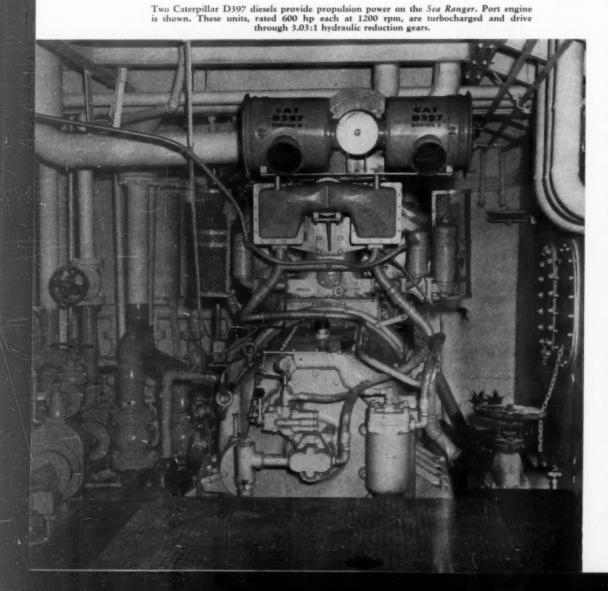
THE 150 ft. Sea Ranger, believed one of the fastest menhaden boats afloat and equipped with two fish holds with a total capacity of 750,000 fish chilled by a sea water cooling system, is in service for the Mayport Fisheries Co., of Fernandina Beach, Fla. The Sea Ranger was built for Mayport by the Southern Division of the Gibbs Corp., Jacksonville, Fla.

Trial runs conducted in the St. John's River at Jacksonville saw the Sea Ranger reach speeds computed at 14½ to 15 knots. Her home port will be Fernandina Beach, however, the seiner will operate in the Atlantic Ocean and Gulf of Mexico. She has a beam of 28 ft., depth of 10 ft. 6 in., and draws 8 ft. of water. The Gibbs Co., also constructed

another menhaden seiner, the R. L. Haynie, Jr., which is a near-twin to the Sea Ranger, last year for the Reedville Oil and Guano Co., Inc., Reedville, Va. The Haynie is three feet longer but the boats are otherwise similar and the description of equipment aboard the Ranger applies equally to the Haynie.

All power, for propulsion, fish pumps, hydraulic pumps and ship's auxiliary service, is provided by Caterpillar diesel engines. Main propulsion for the new craft is supplied by two Caterpillar D397, series D, turbocharged and aftercooled diesels. These engines, with 5¾ in. bore and 8 in. stroke, develop 600 hp each at 1200 rpm. They turn four bladed, 60 in. diameter x 44 in. pitch

Michigan
Caterpillar





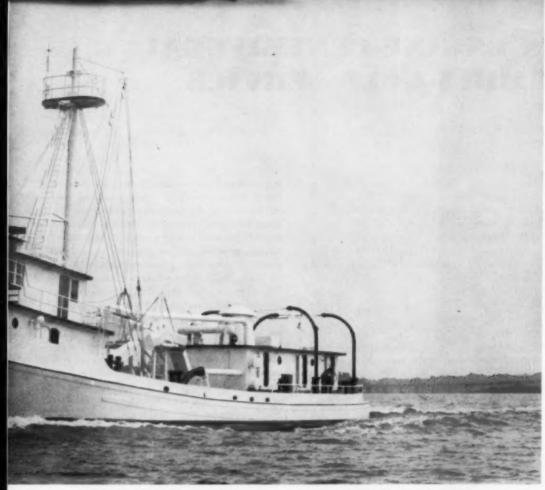
Michigan propellers on 5 in. shafts through Caterpillar hydraulic reduction gears, model 3181, with ratio of 3.03:1.

Generator and auxiliary generator are Caterpillar model SRCV, powered by Cat D311, series H diesel engines. The electric plants have a capacity of 30 kw, ac, 120/208 volts. Electricity from these units powers motors that include the main bilge pump, a 4 in. Marlow turned by a 5 hp Marathon electric motor, and a Demming 2 in. auxiliary bilge pump, driven by a 7.5 hp Reliance electric motor. Maxim silencers are used on these sets.

In the refrigeration system a Frick ammonia compressor, is driven by a Caterpillar model D326, series F, marine diesel engine through a Cotta industrial reduction gear. Through a front power take-off, this engine also drives two 3 in. chilled water circulating pumps and one 4 in. condenser circulating pump for the refrigerating system. The 6 cylinder D326, with bore and stroke of 51/8 x 61/2 in., is a naturally aspirated engine with cont. rating of 137 hp at 1800 rpm.

The crew works around a 10 in. Fairbanks-Morse fish pump powered by a Caterpillar model D315, series G engine. This engine is a turbocharged diesel, with bore and stroke of $41/2 \times 51/2$ in. and rated 80 cont. hp at 2000 rpm. Two hydraulic pumps, driven from the front of the engine, operate the strapping winch and the anchor windlass. They also provide power for hoisting the purse boats and operating the hose-handling winch.

All the diesel engines are keel cooled and air started with the exception of the electric sets which have 12 volt starting systems. The Sea



The Sea Ranger, 150 ft. menhaden fishing boat, has hold capacity for 750,000 fish in her chilled holds. Five Caterpillar diesel engines provide pro-pulsion, electric and refrigeration power on the vessel.

Ranger has two fuel tanks holding a total of 8500 gallons. She is also equipped with a 200 gallon lube oil tank and carries 9000 gallons of water.

The wheel house is equipped with Morse MD-24 single lever throttle and clutch controls for main engines. A two-way radio in the pilothouse permits communications with the two 30 ft. purse boats, spotting planes and company bases. The boat is equipped with automatic pilot and depth control. Steering is with Freidberger hydraulic controls.

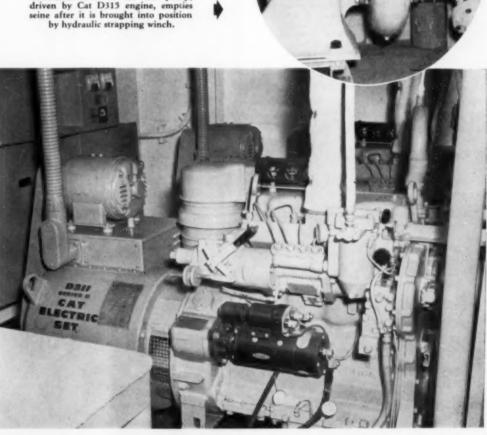
The hydraulic strapping winch, driven by a pump off the D315 Cat diesel, pulls tight the nylon strap running around the seine, bringing the net into position to be emptied by the fish pump. The fish hold is insulated with 4 inches of Styrofoam and temperature in this hold is maintained by valves which control the amount of water entering the chilling system.

The Sea Ranger carries a crew of 22 in addition to her captain, W. G. Oglesby. There are two bunks in the master's cabin plus 22 additional bunks below for the crew. Five 500 watt work lights at strategic places on the boat provide illumination for night operations. Reinforced concrete was poured in certain work areas on the deck to reduce slipping hazards in rough weather.

The D311 electric sets are equipped for battery starting, all other engines on the Sea Ranger are air started. These electric sets are rated 30 kw, ac, 120/208 volts.

This Caterpillar D315 diesel engine, This Caterpillar D315 dieset engine, drives a Fairbanks-Morse fish pump from the rear of the engine. The four cylinder turbocharged engine is rated 80 cont. hp at 2000 rpm.

Fairbanks-Morse 10 in. fish pump, driven by Cat D315 engine, empties seine after it is brought into position by hydraulic strapping winch.



CLARK GAS ENGINE-CENTRIFUGAL IN COLUMBIA-GULF SERVICE

By ROBERT E. SCHULZ

AMPSHIRE, Tenn.—Fifty-five miles outside of Nashville at this station on Columbia Gulf Transmission Company's main line, a new pipeline prime mover has gone into service. I was on hand here in mid-August to see this 4000 hp Clark Bros. two cycle gas engine—centrifugal compressor combination in full automatic operation as it was demonstrated to officials of major transmission and engineering companies.

The model TPV, as it is designated by Clark, is the first two-cycle, turbocharged, V-type gas engine to be placed in gas transmission service. Here at Hampshire it drives a 24 x 24 in. Clark centrifugal compressor through a Westinghouse speed increasing gear of locked-train design. I saw this engine under test at the company's Olean, N.Y. plant in early fall last year and it was subsequently described in our September, 1959 issue. The 4000 hp unit installed by Columbia-Gulf is a ten cylinder engine, the first in the TPV series which will also include 12 and 16 cylinder models rated 4800 and 6400 hp respectively.

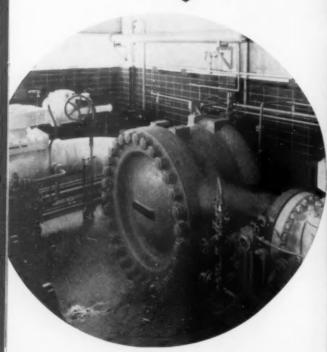
Since the design and construction features of this new engine have been previously described, I will highlight the major features and then go into the Hampshire station application. Basically the TPV engine is an adaptation of Clark's established TLA

line of engines, the first of which were also installed at Hampshire in 1952. Cylinder bore and stroke are retained at 17 x 19 ins. as is the construction of many of the other cylinder components. Principal modification, of course, is the Vee configuration with an articulated rod construction, as shown in the cross section, higher compression ratio (91/2:1 for the TPV as compared to 71/2:1 on the TLA) for higher thermal efficiency. A larger diameter crankshaft (151/2 in.) is used to handle the torsional loading requirements characteristic to rotating equipment. The engine operates over a designed speed range of 270 to 360 rpm and torsiograph readings have substantiated the absence of critical vibration in this range-an important consideration in pipeline centrifugal application. Although complete station testing has not been completed at this time, it appears that fuel consumption will be in the range of 6600 Btu/bhp/hr. Bmep at the rated speed of 330 rpm is 110 psi.

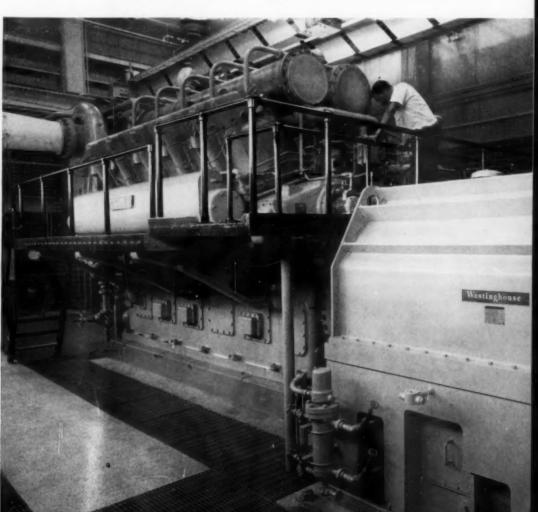
Hampshire was selected by Columbia Gulf for the installation since it would allow officials to evaluate the operation of the non-attended Clark Bros. gas-engine centrifugal running in conjunction with existing engine driven reciprocating compressors at a common compressor station site. (Hampshire has seven 2000 hp TLA Clark units.) The general layout and engineering design philos-

ophy followed in the installation was developed jointly by Columbia-Gulf, Clark Bros. and Gulf Interstate Co., with the latter handling the detailed design and engineering. Station automatic control equipment was designed by Columbia-Gulf for full remote-unattended operation. Operational control of this station, while now locally automatic, will be at the Central Control Center in Nashville. Here the dispatcher will be able to completely control the operation of the engine-compressor by monitoring the required information displayed on the control boards. All operational commands and displayed information is transmitted by a digital pulse system over leased lines. In the event of communications failure between Hampshire and Nashville, the station will continue in automatic operation satisfying the last discharge pressure setpoint command received. Presently in attended semi-automatic operation, the adjoining 14,000 hp reciprocating station as well as Columbia-Gulf's other mainline reciprocating stations are now being set up for remote unattended operation. In contrast to the centrifugal stations, the automation of the reciprocating stations is unique in that all controls are self-contained at the station; the discharge pressure order being the only command from Nashville. Control equipment in each station will determine the number and speed of engines required to maintain discharge pressure.

The 24 in. x 24 in, centrifugal compressor is separately enclosed at the Hampshire Station. A single stage unit, volute assembly can be changed to meet operating conditions. At maximum engine rpm, the compressor is spinning at 5500 rpm.



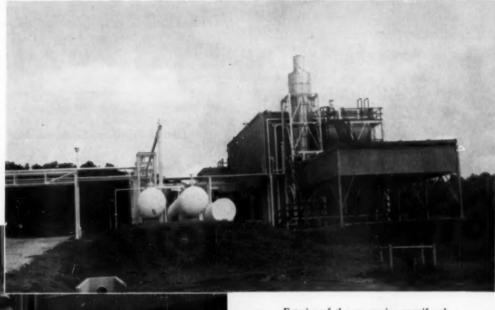




Recriprocating station at Hampshire is comprised of seven 2000 hp Clark Bros. units. All stations of the reciprocating type on Columbia Gulf mainline are now being set up for remote unattended operation.

At Hampshire, the basic design concept was one of low cost service consistent with a high degree of availability and dependability. The engine-compressor unit is completely self-sustaining with all auxiliaries driven by direct power take-offs from the engine itself. The Clark engine uses a constant pressure turbocharging system with intake air cooled for greater density before delivery to the cylinders by a Young aftercooler. The turbocharger has a pressure ratio of approximately 2:1 and is installed with a 2 in. bypass on the exhaust outlet to assure optimum fuel economy. With this arrangement, a valve on the bypass opens or closes according to ambient air conditions to control turbine speed and achieve the desired air-fuel ratio. Natural gas is taken off the discharge side of the line and its pressure reduced to about 40 psi upstream of the governor. Depending on the





Exterior of the gas engine-centrifugal station. In foreground is Young radiator and directly behind it, the Burgess-Manning exhaust muffler and intake air filter-silencer.

Here is the 4000 hp Clark Bros, turbocharged spark ignition gas engine which drives the compressor through the Westinghouse speed increasing gear with a ratio of 15.3:1. Thomas flexible coupling joins engine and gear. Magnetrol control valve on side of gear equalizes lube oil pressure in engine-gear common system.

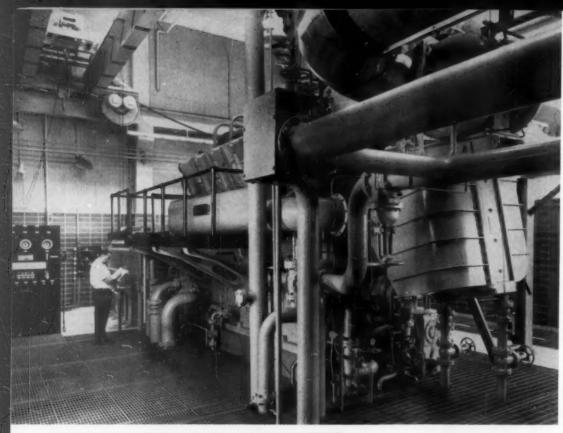
load, it is delivered to the cylinders at from 22 to 32 psi. A closed jacket water system is used with an induced draft radiator driven by the engine. The intake air system employs the new Burgess Manning filter-silencer as well as the same make exhaust snubber. All are clad in stainless steel.

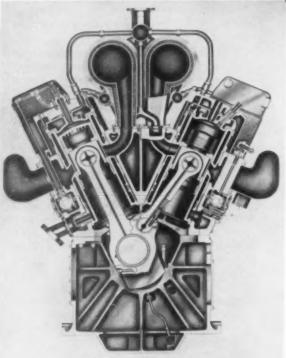
For compactness and accessibility, cooling and lubricating oil system auxiliaries are located on a quarter deck below the engine floor proper and access is provided by removal of floor grates. Notable is the fact that all lube oil piping is aluminum —believed to be a first for the industry. Located in an adjacent auxiliary equipment room is the DeLaval model 67-28 lube oil centrifuge and filter, Waukesha gas engine driven starting air compressor, a 10 kw Kohler gas engine-generator set for supplying emergency power for control equipment, special filters and dryers for control air, etc.

All automatic controls for the engine-compressor unit are located in an enclosed area immediately adjacent to the engine room. The system is essentially electro-pneumatic and provides automatic starting, loading and shutdown of all engine-compressor functions, opening and closing line valves, etc. At the master control board, all of the points are monitored and visual and/or audio alarms positioned for immediate identification of any malfunction. This area is also the communications center linking the station to Nashville.

Not only is this the first gas transmission application of the Clark TPV engine, but the same holds true for the Westinghouse type TP-SU speed increasing gear. Driven through a flexible coupling, the gear is rated at 4800 hp continuous at 360 rpm input speed and has a ratio of 15.3:1. It's interesting to note that the lubrication system is common with the engine through pressure regulated equalizing lines between the gear and engine. As mentioned previously, the basic gear design incorporates an "in line-locked gear" train and the input and output shafts are on the same centerline. The input shaft turns the low speed gear. At either side of the low speed gear are twin low speed pinions which turn dual quill shafts to twin high speed gears. These gears in turn drive the high speed pinion and output shaft.

The pipeline booster is Clark's 24 x 24 low ratio, high volume centrifugal compressor. The TPV engine-compressor unit will operate as the base load machine for the Hampshire station and is installed on the suction side with its discharge going to the TLA reciprocating station. The compressor is separated from the engine-gear by a fire wall and is completely enclosed to facilitate maintenance in inclement weather. The compressor itself has a large exterior casing, a removable volute

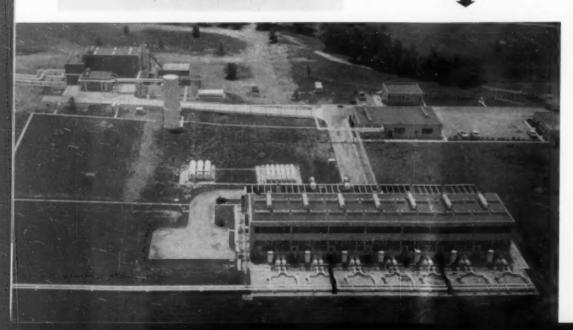




Engine room with engine control panel to left. Clark engine uses American Bosch ignition system and is equipped with Young intake air intercooler. Note exhaust bypass arrangement covered in story. Approximately 150 psi is used in pneumatic engine control system.

Cross section of the Clark TPV twocycle, turbocharged, V-type gas engine. Main shaft has 15½ in. dia. Note articulated connecting rod design.

Birdseye view of Hampshire station with reciprocating station foreground and centrifugal station upper left. Texaco lube oil and Dow ethylene glycol coolant are separately stored in above ground tanks between stations.



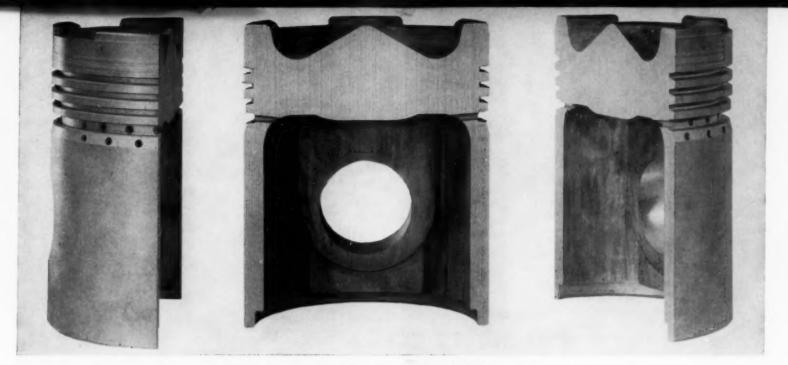
and removable guide vanes. The pitch of the guide vanes can be varied to maintain peak efficiency over a wide range of operating conditions. At maximum engine speed, the compressor is turning at 5500 rpm; at 270 engine rpm, compressor speed would be 4120 rpm. The compressor design point is at 83 per cent adiabatic efficiency and a volume of 850,000 mcfd—at the present volume, the efficiency is in the vicinity of 75 to 80 per cent.

Location of the new station at Hampshire with respect to the TLA station is illustrated, and it is as efficient in design as it is attractive. The building incorporates a new design concept with three sides constructed of acoustical aluminum sandwich type paneling—the fourth being the fire wall. Though divided into three main sections (engine room, compressor room, and control and auxiliary equipment room), to assure no high pressure gas reaching the engine section, Columbia-Gulf has taken an extra precautionary measure by installing a blower that maintains a slight positive pressure in the engine room. An automatic overhead sprinkler system is also installed and tied-in with the engine shutdown control.

The demonstration at Hampshire, as sponsored jointly by Clark Bros. and Columbia-Gulf, was well planned with ample opportunity for complete inspection of the station facilities. Those in attendance were personally escorted and it was my pleasure to tour the station with Compressor Station Superintendent Jim Wilhoit.

List of Principal Equipment

Gas engine	Clark Bros.
	Westinghouse
	Clark Bros.
	Thomas
4 0	Young
	Woodward
	Texaco Ursa
	DeLaval Separator
· ·	CFC Fulflo
	Peco
	Elliott
	Manzel
	Burgess-Manning
	Burgess-Manning
	Ross
	Young
	Ren (Power Plus)
	Clark Bros.
	Waukesha
	set Kohler
	General Electric
	American Bosch
Spark plugs	Champion
	Minneapolis-Honeywell
Turbine tachometer	Weston
Turbine controller	Taylor
Lube oil pressure con	trol Magnetrol
facket water control	Minneapolis-Honeywell
-	Mercoid
Control valves	Mason-Neilan
Automatic control com	ponents Westinghouse Air
	Brake, Foxboro, Norwood,
	Crouse-Hinds Ashcroft,
	Moore Products, Nord-
	strom, Farady
Standby batteries	Exide



Piston produced by impact extrusion process developed by Thompson Products Light Metal Division. Note smooth surface of unmachined inside surface.

DIESEL PISTONS FORGED BY NEW PROCESS

THE continuing production of higher output diesels by many of the major builders, has brought about a number of important developments by manufacturers of engine components—parts that must meet the demands of higher temperatures, pressures, speed and overall performance. One manufacturer doing important work along these lines is the Thompson Products Light Metals Division of Thompson Ramo Wooldridge, Inc., Cleveland, which has developed a new method for producing aluminum pistons for diesels by an impact extruding process. This process is in effect a method of forging the pistons and provides desirable qualities in piston structure from a metallurgical and service standpoint.

This impact extrusion process is essentially a process that exerts tremendous pressures while literally ramming aluminum slugs into pistons. According to Thompson Products engineers, the consistent density of the piston due to the high impact forging process provides a uniform heat conductivity throughout the piston, offering good properties in this very important area. Impact extrusion creates a new, dense grain flow in the metal being worked and gives high strength qualities and uniform metal density throughout the piston. This consistent density allows for improved and uniform heat conductivity away from the piston head and thereby gives lower head temperatures.

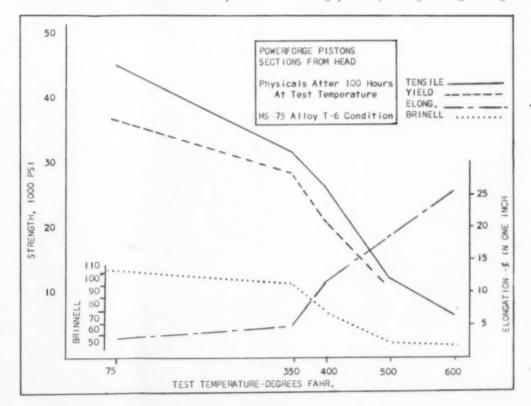
The grain flow structure also strengthens the piston skirt while at the same time giving the skirt flexibility. The grain flow up and down the skirt makes it resistant to scuffing. TRW impact extruded piston elongation qualities of 6-8 per cent means the pistons have the ability to elongate without

Chart of characteristics of impact extruded piston showing tensile strength, hardness, elongation properties under various temperature conditions. failure even though the material has been stressed beyond the elastic limit. This contributes to long life and breakage and cracking resistance.

Thompson engineers report they can produce the forged pistons with cast iron inserts, ni-resist inserts in the top groove and other special requirements in the diesel field. They also stated that the forging process can be used to produce intricate piston crown shapes very accurately to eliminate or minimize machining of this surface. The forging process also holds to tolerances of between .005 and .010 in inside surfaces of the piston,

which makes chucking easier for machining on the outer surfaces without machining the inside. Impact extrusion also holds close weight control and with the close tolerances, low balance pad requirements are evidenced.

Summing up, the strength through grain flow and consistent density in the piston structure that is achieved with this impact extruding process indicates the process contributes to longer piston life and allows design of lighter pistons; close tolerances held in the production process allow easy machining, possibility of weight saving in design.



NOVEMBER 1960

DIESEL UNIT PROTECTS ATOM LAB

THE General Electric Atomic Power Equipment Department provides a wide range of nuclear equipment and services. The department's multimillion dollar Vallecitos atomic laboratory at Pleasanton, Calif., is a completely equipped commercial facility devoted entirely to nuclear investigation and experiment. The 30 megawatt test reactor can be used to perform engineering tests on reactor fuel and components and other technical experiments. A great deal of space in the reactor is made available for industrial testing.

Because of the ever-increasing demands placed on the Vallecitos laboratory to expand its test service, management found the most effective way to get maximum performance from the reactor was to operate it for a 24 day operating cycle and then shut down for four days. During this downtime preventive maintenance was initiated, and new test specimens set up for the next operating cycle.

This new concept in test and research reactors requires a constant supply of power to maintain continual operation. Outside electric power is received on the reactor site at three load centers or distribution panels. But due to the specialized nature of the laboratory equipment, technicians were greatly concerned about the possibility of an outside power failure because all the emergency equipment, particularly the critical components of the reactor cooling system, which requires circulation of 11,000 gallons of water a minute, would then fail to operate, causing immeasurable damage to the reactor components. In order to alleviate this potential danger a decision was made to use a



Engineers at the GE Atomic Power Equipment Department keep watch as a test component is lowered into the test reactor at the Vallecitos Atomic Laboratory.

diesel generator to take over the full load emergency power in the event outside power fails.

A Cat D353 diesel was installed to power the generator. It operates at about one third load at all times, producing 50 kw, thereby sharing the power load with the local utility. The reason for continual operation of the diesel, not standby operation, is that if the outside power failed it would take 10-15 seconds for the diesel to get started and pick up the load. This delay though small, is crucial, and would be sufficient to ruin the reactor. So the Cat engine operates at all times furnishing power to one load center which supplies the power for all emergency equipment, such as the entire ventilation system, emergency cooling system, instrument panel, emergency experimental power, elevator, and fan. The D353, with 61/4 x 8 in. bore and stroke, is rated 290 hp at 1200 rpm. In case of a power failure the diesel automatically picks up load to 150 kw without any loss of time and operates the entire load center including the cooling system for experiment, ventilation system, instrument panel, emergency experimental power, and elevator until utility power comes on.



Caterpillar D353 diesel engine, rated 290 hp at 1200 rpm, drives a 150 kw generator to provide emergency power at the laboratory. Engine runs continuously during 24 day test periods, provides 50 kw in normal operations, increased to 150 kw in emergency conditions. Note Woodward governor, Donaldson air cleaner.

GAS ENGINES PROVIDE LIFT AT ORANGE COUNTY PLANT

Variable Speed Climax Engines Operating on Vapor Phase System and Burning Sludge Gas Provide Sanitation Districts with Economical, Efficient Control of Sewage Flow

By JAMES JOSEPH

N-the-line for the County Sanitation Districts of Orange County, Calif., is a phalanx of gas fueled, variable speed, Vapor Phase cooled Climax engines (V-85s and V-122s) which, often working around the clock at the Districts' two sewage plants, are pacing what amounts to a population explosion: since 1950, Orange County's population has more than tripled. To keep pace, the county's seven sanitation districts have more than doubled capacity of their Plant No. 2 (at Huntington Beach, Calif.), upped to 55 million gals./day the sedimentation capacity of Plant No. 1 (41/2 miles upstream near Fountain Valley) and completed a 7000 ft. ocean outfall (the reinforced concrete line's diameter some 78 ins.,) its ultimate capacity about 240 million gals./day.

At both plants, the Climax gas engines literally give incoming sewage a boost: Plant No. 1's two Climax V-85 engines work thru Rawson 16x5 centrifugal clutches and 2:1 right angle Western reduction gears, driving variable speed 30 mgd capacity Fairbanks-Morse headworks pumps. Pumps lift incoming sewage some 18-20 ft. into the plant's grit chamber (from where in-plant flow—and eventually flow to a downstream booster station at Plant No. 2—is by gravity).

At work at Plant No. 2's booster facility are three Climax V-122 engines (scheduled soon to be back-stopped by addition of several more V-122s). The engines, driving booster pumps, lift sewage into surge towers during peak flow and during periods of high tide (this, to maintain flow in the ocean outfall line). "Right now," explains the Districts' Superintendent of Operations, Robert N. Galloway, with an eye on the upward-spiraling county population chart, "Plant No. 2's booster pumps and their engines work only during peak flow . . . or when the tide is high." "Eventually," he continues, "they'll have to run most—perhaps all—of the time, upping the system's pressure, thus its sewage-handling capacity."

It'll be awhile yet, however, until the outfall's 240 million gal. design optimum is even approached. Plant No. 1's headworks pumping capacity-optimum-is some 90 millions gals./daý

Here, at headworks of Plant No. 1, work two Climax V-85 Vapor Phase cooled gas engines driving 30 mgd capacity Fairbanks-Morse pumps through Western gears. Two 150 hp electric motors, between the two Climax engines, are on standby, work identical pumps.





Mercoid units monitor (left to right), engine starting, water pressure, gas pressure.



(and this, though it is served by four 30 mgd pumps). Plant No. 2's capacity has been upped to 70 mgd, from but 30 mgd back in 1954. Total pumping capacity of both plants, then, is some 160 mgd, far short of the outfall's design maximum.

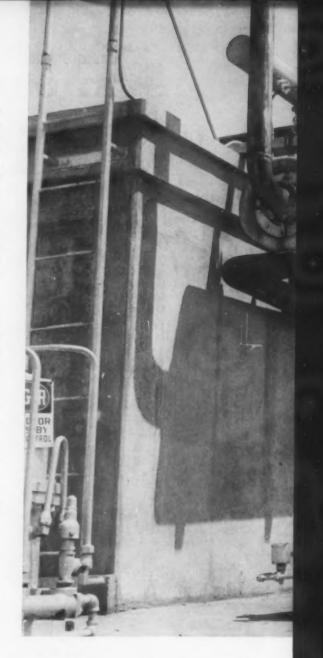
Two of Plant No. 1's four Fairbanks-Morse 30-inch angle flow, 21,000 gpm pumps are Climax engine driven. Two—currently on standby duty—are powered by 150 hp electric motors. Key to the plant's sewage-paced operation is variable pumping capacity, powered by the variable speed Climax V-85s. Significantly, the 440-volt, 3-phase electric motors are constant speed units.

Plant No. 1's two V-85 Climax engines—8-cylindered, with a bore of 7½ ins., a 7 in. stroke and 2474 cu. in. displacement—are rated 150 hp at 770

rpm, some 70 hp at 640 rpm. Engine load is automatically disengaged via the centrifugal clutch when engine rpms fall to 400. The same load engages at 450 rpm. Engines idle at 350 rpm. Working—as do the engines—thru 2:1 reduction gearing, the 30 in. angle flow pumps turn at about 385 rpm when engines, at top speed, are turning 770 rpm. Engine speed control is via Woodward type PG-PL pneumatic-hydraulic governors. The Woodward units receive a 3 to 15 psi air signal from the central panel of the controller system. Engine speed—thus variable control—is predicated on increment increases (raising speed) or decreases in control air pressure.

The Climaxes could really be called "triple-fueled": over much of their operations, they burn sludge gas, though they start on either natural gas (piped to both plants) or on propane standby fuel (storaged in two 500-gallon vessels). Thus, engines are rigged with two carburetors. Incoming sludge gas is scrubbed prior to fueling the engines. Each engine is cranked-to-start by Delco-Remy starter motors powered by three 12-volt Exide 8-D batteries. Start-up is fully automatic thru Custom Built Controls. Shutdown is just as automatic. in case of low oil pressure, overspeed or low water level in the Vapor Phase units. Cold-started on natural gas or standby propane, engines are automatically switched to sludge gas when jacket water temperatures reach 220-225°F. Plant No. 1's sludge gas, rated 550 Btus, comprises about 35% CO2. 60% methane and the remainder, sulphides.

The Vapor Phase systems' shell and tube condensers are sized to condense all steam formed by the engines at full load with some 50 gpm of softened water circulating the tubes. Water enters the engines at about 145°F, exits at 175°. Condensers' maximum capacity is 750/lbs./hr. of zero psi steam with 50 gpm of water entering at a maximum



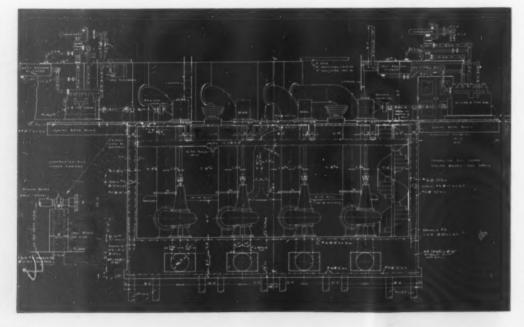
145°F. Each Engineering Controls, Inc. installed Vapor Phase unit is equipped with:

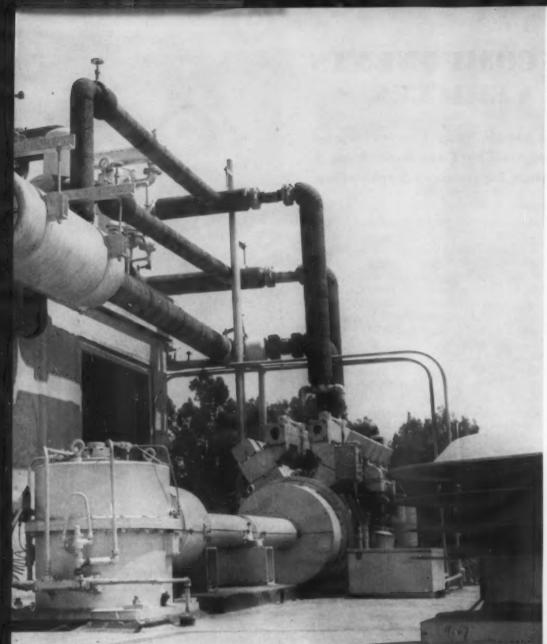
- A level control valve which adjusts fresh water make-up for the system and maintains a minimum water level.
- b. A low-level cut-off for engine shutdown.
- c. Air vents and vacuum breakers.
- d. Pressure relief valve set at 3 psig.
- e. Pressure gauge-0-30 psig-with shut-off coil.

Additional engine heat is recovered thru a Maxim heat recovery silencer. Involved is a closed-system heat exchanger which transfers exhaust heat to the Vapor Phase unit's condensers (sized to serve both the silencer recovery unit and the engine jacket water system). Water circulates from the Vapor Phase units to digester heat exchangers, and supply approximately 50 per cent of the digesters' heat requirements. A steam boiler supplies the rest.

Both of Plant No. 1's Climax engines are installed open-air, their concrete base blocks some 12 ins. thick, the overlying engine slab 4 ins. thick. Engines drive in-line shafts supported on 9 in. thick, 23 in. wide concrete pillars. Typically, the guard-

Section through Plant No. 1 showing the dual Climax engine-FM pump installation.





pumped to five primary and secondary digesters, their size ranging from 60 to 90 ft. dia. Meantime, the plant's treated main flow routes thru 4½-miles of 66-in. line to near-ocean Plant No. 2 and is boosted, when necessary, into the ocean outfall.

Plant No. 2-which serves among others the nearocean communities of Huntington Beach, Newport Beach and sections of Costa Mesa-also routes its output into the ocean line. The two additional 300 hp Climax V-122s, now going into Plant No. 2, will boost sewage some 25 ft., this for internal plant flow. Typically, Plant No. 2's Climax V-122s are 12-cylindered, have a bore-stroke of 7 in. and a 3232 cu. in. displacement. The three booster Climax engines of Plant No. 2 are rated 300 hp @ 1010 rpm. The two headworks Climaxes are rated 250 @ 981 rpm. Plant No. 2 doesn't use the Climax engines' Vapor Phase heat in its digesters. Instead, engine heat is "wasted" thru coolers. And engines are directly coupled thru right-angle 2:14:1 Western gearing to their Fairbanks-Morse pumps.

Lee Nelson is the Sanitation Districts' general manager. Assistant general manager is Paul Brown. Chief engineer for both plants is Ray Lewis.

Principal Equipment Listing

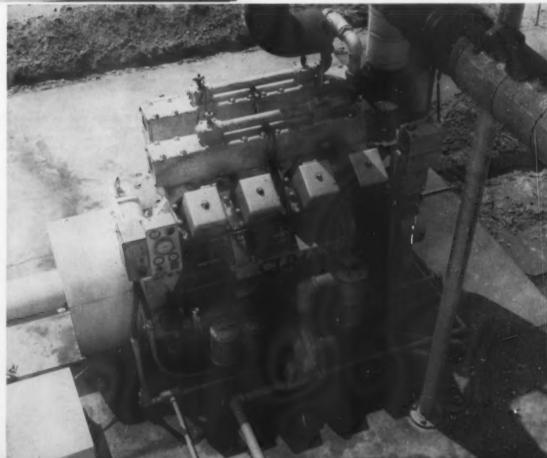
Engines Climax
Pumps Fairbanks-Morse
Centrifugal clutches Rawson
Reduction Gearing Western
Magneto (dual ignition) American Bosch
Air cleaners Vortox
Silencers (recovery type)
Speed governors Woodward
Start-up, shutdown controls Custom Built
Vapor Phase cooling Engineering Controls, Inc.
Fuel-gas regulator Fisher
Starting motors Delco-Remy
Batteries Exide

Pump-end view of Climax engine setup at Orange County Sanitation Districts' Plant No. 1. Note Maxim heatrecovery silencer. Near-engine building contains water treatment equipment. On building's roof is Vapor Phase system supplied by Engineering Controls.

V-85 Climax gas engine rated 150 hp at 770 rpm drives Fairbanks-Morse 21,000 gpm pump through Western gear. Engine is equipped with Woodward pneumatic-hydraulic governor and start-up is fully automatic through Custom-Built controls.

sheathed shaft runs thru a pillow block atop the first pillar, is supported by a second pillar just before the Rawson units, then couples into the Western reduction units.

Sewage incoming to Plant No. 1 via five main lines (30 to 51 ins. dia.) enters the interceptor channel, routes thru bar screens (which screen any debris larger than 1 in. dia.), then flows into one of two 24 ft. deep wet pits, routes into any of four 36 in. dia. transition suction lines . . . which lead to the four 30 in. pumps. Boosted a maximum 20 ft., sewage is pumped into the grit tank. From the grit tank, sewage is gravity distributed to four primary sedimentation basins (90 to 140 ft. dia.). Sludge is



TRANSMISSION COMPONENTS FOR LARGE VEHICLES

New Power-Shift Transmission, Single Stage Converter and Universal Joint Lines to Be Produced by Twin Dise; Aimed at Higher Horsepower Off-Highway Equipment Application

ILWAUKEE, Wis.—Here at the SAE Farm, Construction and Industrial Machinery Show, held in mid-September, Twin Disc Clutch Co, introduced two new product lines—power-shift transmissions and universal joints—which now places the company in the position to furnish a complete line of power transmission components from engine to axle. Also, according to Transmission Sales Manager Jack Yetter, Twin Disc is expanding its research and testing facilities to develop the control systems which actuate and govern converter-transmission functions.

Designed for diesels developing up to 420 net hp at speeds up to 2100 rpm, the new transmission is a five-speed forward, one-speed reverse unit desig-

IE- IG d FL STHREE-STAGE T

nated model TA-51-2001. It was developed to keep pace with the industry's growing use of higher horsepowered off-highway equipment and it is designed as a straight-thru-countershaft type with constant mesh gearing. The transmission incorporates specially designed multiple disc, oil cooledhydraulically actuated clutches with an internal valve arrangement to permit transferring oil from one side of the duplex clutch to other. This arrangement allows quick shifting at full engine power in all ranges. Introduced with the transmission, is a new 18 in. single-stage torque converter which is unique from Twin Disc's standpoint in that it is their first freewheeled stator unit with hydraulic paddle-wheel retarder and lock-up clutch between pump and turbine. The converter and transmission will be furnished as a package unit or, if preferred, for independent transmission mounting such as required in large scrapers, etc.

Although the transmission has five gear ratios in forward, the selector valve has six forward positions—in that the second gear ratio consists of two ranges—the converter range, and the lock-up range. Converter drive is used in the first two ranges to get the load moving and to accommodate widely varying tractive effort requirements which are more frequently encountered at the lower speeds. The converter is locked up manually at the high end of second range and maintained in lock-up through all subsequent ranges. However, a manual over-ride can be provided to permit converter drive in all ranges.

If desired, the basic transmission's internal gearing can be converted to give three speeds forward and three reverse which makes it suitable for large front end loaders. By adding a drop box,



New Twin Disc converter-transmission package for engines developing up to 420 net hp at speeds up to 2100 rpm. Single-stage torque converter is equipped with freewheeled stator, hydraulic retarder and lock-up clutch. Transmission is straight-through countershaft type with five forward speeds and one reverse. All lube lines are internal. While shown combined, in most applications the units will be mounted separately.

now under design at Twin Disc, the transmission would also be well suited for application on switching locomotives.

Three different models of the transmission with respect to gear ratios and ratio coverage are contemplated. The model 2001 transmission provides

Left, Fred Potgieter, recently retained Twin Disc sales and engineering consultant (at left) discusses new universal joint with W. B. Gibson, sales manager, Hydraulics Division. Below is the new medium-sized, heavy duty double universal joint to be manufactured by Twin Disc based on GWB design principles.





a 5.93 ratio coverage and is the version slated for

most truck applications. It has a maximum input

speed rating of 2500 rpm. Model 2002 transmission

provides an extended ratio coverage of 6.80 and

this is obtained by changing a total of four gears

in the input drive section. The model 2003 transmission is a "down the road" version for use with

engines having speeds up to 2800 rpm. The ratio coverage is reduced to 5.45 and again—a change of four gears in the input drive section is the only requirement.

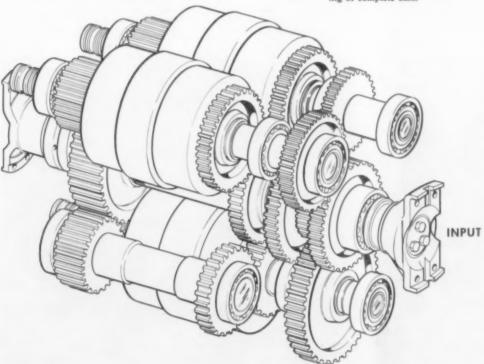
TA-51-2000 Series Transmissions

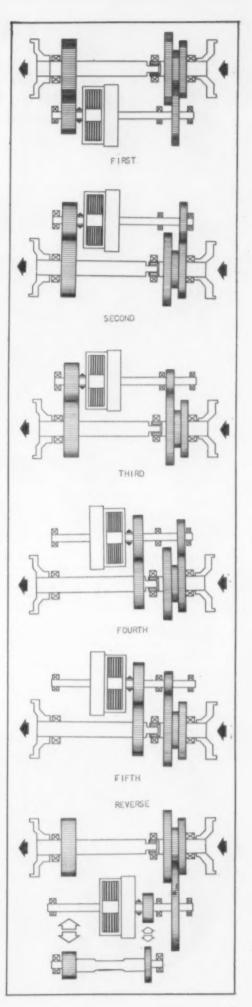
Mod	lel No.		2001	2002	2003
Gear	Gear Ratios Is	Ist	4.64	4.64	4.64
		2nd	2.17	1.85	2.29
		3rd	1.53	1.34	1.66
		4th	1.11	.950	1.18
		5th	.784	.685	.852
		Rev.	4.64	4.64	4.64

Now, taking a look at Twin Disc's new line of universal joints—the company has entered the U-joint field as exclusive licensee of the West German firm of Gelenkwellenbau GmbH. For many months Twin Disc had been training design, application and production engineers in the GWB concept of U-joint engineering. The company now has in design and prototype testing stage a series of units for heavy industrial equipment. In these U-joints the engineering principles of the German product have been adapted to American requirements. Production is scheduled to begin in early 1961 at the company's Hydraulic Division plant in Rockford, Ill.

Twin Disc will devote its production effort to medium-size heavy-duty U-joints with application in rail, construction and oilfield equipment, off-highway trucks, marine, etc. Through its exclusive licensing agreement, however, the company will also import large needle-bearing GWB joints from Germany, such as are used in rolling mill equipment. These units have maximum operating torque values ranging from 5,000 to 180,000 lb. ft. These GWB extra-heavy-duty joints will be covered by Twin Disc's standard warranty and nation-wide service network.

Diagrammatic views to the right show the five gear ratios in forward and reverse ratio on the new TA-51-2001 transmission. View below shows drawing of complete unit.





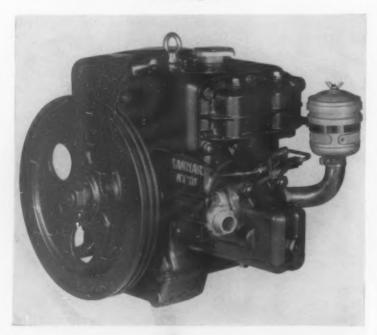
YANMAR DIESELS

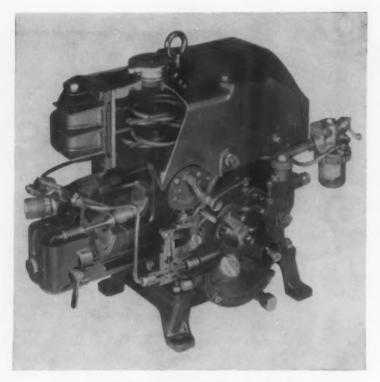
Line of Compact, Lightweight, Low Horsepower Diesels Ranges From 2 HP
Up to 8 HP in Four Sizes. Available in Air-Cooled and WaterCooled Versions, They Are Adaptable for Both
Marine and Industrial Services



Model NT-65-M, water cooled. This is the smallest and lightest of the NT series, weighing only 117 pounds. Note that all operating controls and service points are located on the front and top of the unit. The oval shaped cover plate above the cranking stub allows the use of a mechanical fuel pump where a remote fuel source is used in lieu of the engine mounted tank.

Model NT-70-M, water cooled, (basic engine). This marine auxiliary engine is equipped with an integral heat exchanger and features many standard installation options including a wide choice of fuel supply, starting, exhaust mounting and drive arrangements.





Cut-away view of model NT-65-M. Note the decompression lever for ease of hand starting, the unique heat-exchanger complete with zinc anodes, and the overall simplicity and cleanness of design.

Model NT-75-L, water cooled. The integral radiator and fuel system makes this model particularly useful for portable applications. The NT-L series engines feature the same wide choice of installation options offered in the NT-M marine auxiliary version.



DIESEL AND GAS ENGINE PROGRESS

HE Continental Machinery Corporation, P.O. Box 5309, Long Beach 5, California, is now offering the complete line of series A-L and series NT-M Yanmar diesel engines. These models are illustrated on these two pages. Horsepower ratings of the A-L series runs from 2 hp to 3 hp on the model A-2-L to $2\frac{1}{2}$ hp to $3\frac{1}{2}$ hp on the model NT-M series runs from 2 hp to $3\frac{1}{2}$ hp on the model NT-65-M, to $2\frac{1}{2}$ to 4 hp on the model NT-70-M, and then the next step is 3 hp to $5\frac{1}{2}$ hp on the model NT-75-M, and the largest model now offered in this country ranges from $4\frac{1}{2}$ hp to $7\frac{1}{2}$ hp for the model NT-85-M. Performance curves for all of these engines will gladly be supplied on request to the Continental Machinery Corporation.

The Yanmar diesel may well be known to many of our readers, because it has been manufactured in Japan for a number of years and is well known internationally.

The Yanmar factory, producing as it does in excess of 100,000 engines per year, insures low prices commensurate with high quality.

As will be seen on the cross sections on these two pages, it is a 4-cycle valve-in-head design, combined with a precision built fuel injection equipment, conservative proportioning of parts which

The general specifications of the series NT-M include-4-cycle full diesel type-20/1 compression ratio; single cylinder of replaceable microhoned wet-liner type; water cooled by zinc anode protected integral heat exchanger; cylinder liner gears, etc. of durable ductile iron; piston, water tank, covers, etc. of lightweight aluminum; crankshaft and connecting rod of forged alloy steel; high frequency induction hardening of critical wearing surfaces; all bearings of replaceable type-precision shell or ball: crankcase lubrication by gear pump and splash-vapor; governor is trouble-free centrifugal type inside gearcase; reduction gearing on cranking shaft to permit easy starting; installation connections made to American size standards and all units are dynamometer tested and guaranteed.

Optional accessories for the model NT-M include a 12 volt electric starter-generator; mounting legs and vibration dampeners; salt water circulation pump kits; choice of standard size stub drive shafts; choice of standard load-coupling devices; special exhaust system components; choice of gauges for local and remote use; integral fuel tank with fill strainer; fuel pump for remote supply tanks; hardware for remote engine control and integral platforms for driven equipment.

The guarantee on these Yanmar diesels offered by the Continental Machinery Corporation is worthy



Cut-away of air cooled model A-3-L. Note clean design and fully machined aluminum cooling fins on cylinder barrel. Crankshaft or half-speed camshaft drive is available, as well as a built-in 6-volt generator.

GENERAL INFORMATION						GENERAL INFORMATION			
	I				District of	DESCRIPTION	UNITS	A-2-L	A-3-L
BORE × STROKE	mm	65 x 75	70 x 80	75 x 90	85 x 100	BOREXSTROKE	MM	60 × 66	65 × 72
(ins. are approx.)	Ins.	2.6 × 3.0	2.8 × 3.1	3.0 x 3.5	3.3 × 3.9	(approx. equiv.)	INCHES	236×256	21/2 x 2%
DISPLACEMENT	cu. ins.	15.2	18.8	24.3	34.6	DISPLACEMENT	CII INI	11.41	14.58
PISTON SPEED	ft./min.	985	1050	1120	1180			11,41	14.30
NET WEIGHT	lbs.	117	169	192	251	PISTON SPEED	FT./MIN.	1125	1230
SHIPMENT WT.	Kg.	95	115	150	180	NET WEIGHT	POUNDS	76	99
SHIPMENT VOL.	CU. ft.	8.0	8.5	10.4	12.9		-		
ROTATION COUNTERCLOCKWISE VIEWING FLYWHEEL					SHIPPING WT.	KG.	57	80	
NOTE: Piston Speed Given For Recommended Max. Continuous RPM					SHIPPING VOL.	CU. FT.	4.6	6.0	

goes to provide a very practical, dependable small diesel engine.

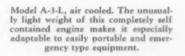
Both units here illustrated have been adapted to marine service as well as industrial. Naturally there is a very logical market in the marine field for these engines for auxiliary drive purposes.

Specifically referring to model A-L, their design features are principally that they are air-cooled, single-cylinder units of 20/1 compression ratio with five piston rings, four compression and one oil; flywheel blower for dependable cooling; maximum use of durable lightweight alloys; crankshaft and camshaft of alloy steel; critical wear surfaces induction hardened; bearings of replaceable precision type; sensitive built-in mechanical governor; high-pressure solid-injection fuel system; efficient splash-vapor lubrication, and all engines are dynamometer tested and guaranteed.

Customized accessories designed to simplify installation problems include—choice of matched drive accessories; anti-vibration mountings; carrying frames for portable rigs; special remote operation accessories and emergency kits of parts and tools. of being made a part of this description, so we quote it. "Each new Yanmar A-L series or Yanmar NT-M series engine is guaranteed against defective materials and workmanship, and Continental Machinery Corporation will furnish free a duplicate of any parts giving out due to those causes under conditions of normal continuous duty operation, provided such defect is reported in writing to Continental Machinery Corporation within one year after date of retail invoice, and provided those parts deemed to be defective are sent (shipping charges prepaid) for examination when requested.

"American-made accessories are not included under this guarantee since they are warranted by their separate manufacturers. Continental Machinery Corporation shall in no event be liable for consequential damages or contingent liabilities through the failure of any engine, engine part or accessory.

"The right is reserved to make changes in specifications and prices in order to maintain a policy of continuous product improvement as research and technical advancements may dictate without incurring any obligations to prior production."





NEW TANDEM TRACTORS IN WHITE LINE

DDITION of a complete line of White pusher-tandem diesel tractors which provide 7600 to 12,000 lbs. more payload on shorter wheelbases, to the \$000, 4000, 5000, and 9000 series has been announced by the White Truck Division. The division also introduced a new medium-duty tandem chassis designed particularly for bridge formula states in dump body applications or in mixer operations ranging from four to six cu. yds.

The new White diesel tractors, are the 3462TDP, with electrically actuated tilt cab; the 4462TDP; the 5462TDP, a pusher model with fiberglass cab and 50 in, bumper to back of cab dimension; and the 9062TDP, 90 in, bbc dimension pusher. The new medium duty chassis has been designated model 4264DS. The 5462 TDP has a maximum gcw rating of 80,000 lbs.; others in the new TDP line have gcw's of 76,800 lbs.

The diesel engines used in the new White trucks are manufactured by Cummins; the standard engine in the TDP models is the NH-180, which develops 180 hp at 2100 rpm and maximum torque of 504 ft. lbs. at 1525 rpm. Displacement is 672 cu. in.; compression ratio is 15.5:1. Optional Cummins engines up to 220 hp at 2100 rpm are also available. All engines available on the 5462-TDP pusher are lightweight aluminum diesels.

Standard transmission in the 3462TDP, 4462TDP, and 9062TDP, is the 1026B 10-speed Fuller Road-Ranger with close-spaced ratios (27 per cent). The transmission has been tailored for the Cummins NH-180 diesel. The power-shifted auxiliary section of the transmission is unusually compact and is combined with a heavy-duty 5-speed forward section to provide an easily shifted unit. Access



White pusher-tandem 3462TDP diesel tractor has Cummins NH-180 engine rated 180 hp at 2100 rpm. Note Winslow lube oil filter.

is provided to a separate power takeoff gear through right and left PTO openings.

The standard transmission of the 5462TDP, which emphasizes weight-saving materials throughout, is the Fuller RoadRanger 1026BL, which essentially is the 1026B with an aluminum case. The clutch on each TDP model is 14 in. diameter, two plate, dry. It is air actuated on the 5462TDP.

The tandem on all TDP's consists of a White 124C drive axle (gear ratios: 4.11, 4.30, 4.63, 4.88, 5.29, 5.57), single reduction, fully floating with 20,000-

pound rated capacity, and Rockwell-Standard TK-561-P pusher axle with 16,000 lb. capacity.

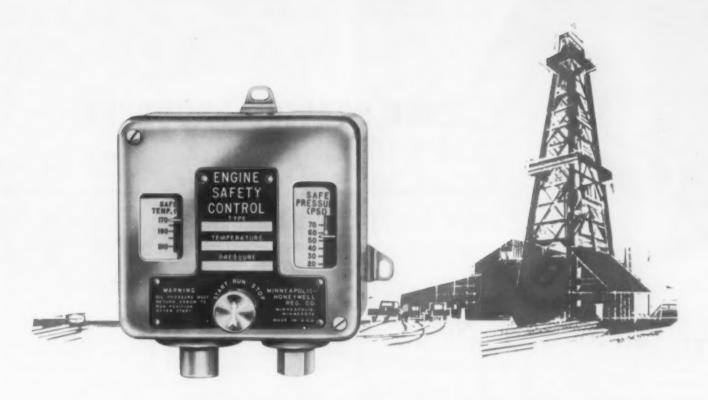
The 4264DS medium duty chassis has a Cummins C-160 engine, Clark 290V five speed transmission (ratio: 1st-7.88, 2nd-4.41, 3rd-2.63, 4th-1.48, 5th-1.00, and reverse-7.33.) It also has three-speed auxiliary transmission. Rear axle is the single reduction, hypoid center, full floating type with inter-axle differential lockout. Its rated capacity is 34,000 lbs. and ratio 4.11, 4.44, 4.63, 5.29, 5.83, 6.17, 6.83, 7.20, 7.80. Hendrickson suspension is standard.

The White tandem diesel pushers all are available with 50-50 or 45-55 tandem weight distribution when equipped with Rockwell-Standard TK—561-P dual-tire pusher axle. With dual-tire pusher axle capacity at 16,000 pounds, the distribution thus may be 16,000 pounds on each axle or 14,400 on pusher and 17,600 on drive axle. With the single-tire pusher axle, the weight distribution is 1/4 on the pusher axle and 2/4 on the drive axle.

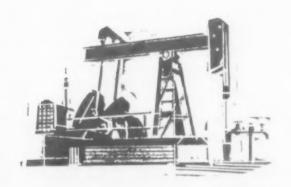
Front axle on the 4462TDP and 9062TDP is the 115D with 8,500-pound rated capacity. The 3462-TDP has a 116D front axle with 12,000-pound capacity and the 5462TDP a 122D with 9,000-pound rated capacity.



Model 5462TDP tractor is a lighterweight version of the 3462 with fiberglas cab. Inset shows pusher-tandem with V-belt drive.



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Protect your investment with Honeywell's fail-safe controller ... especially vital for unattended engines. Why risk severely damaging even one engine because of over-heating or loss of oil pressure? By installing Honeywell's combination engine safety control, you'll help put a stop to costly repair bills and downtime. It's better than having an operator there to stop an engine or sound an alarm when trouble starts.

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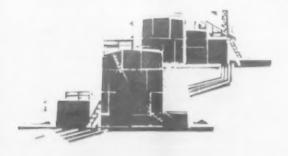
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IESEL SERVICE PROGRESS

A COMMENTARY BY GEORGE R. MACKEY

George R. Mackey was long associated with Detroit Diesel Engine Division of General Motors Corp., and had prior experience as a mechanic in Europe and the U.S.A., which enabled him to become well acquainted in the diesel and service fields and to obtain a broad scope of the service industry from the customer's and management's viewpoint. Further training at Carnegie Tech and in the Army Ordnance during World War II provided the necessary requirements in planning service programs. Progressive advancement in diesel service areas in General Motors and with Detroit Diesel led to his position as Supervisor of Service Promotion. Upon termination of employment with General Motors in 1952, he joined Clayton Manufacturing Company, and his present position with this organization is Sales Manager of the Dynamometer Division.

Diesel Engine Efficiency

NDER-LOAD experimentation during the development of our modern diesel engine proved the importance of "engine breathing" for developing maximum horsepower. By properly controlling the effective time during the intake portion of the operating cycle, adequate air for both scavenging and combustion could be assured. It was found that if exhaust gases remained in the cylinder after the completion of the exhaust cycle the incoming charge of air became contaminated. Therefore, it is a design criteria that all exhaust gases be forced from the cylinder during the exhaust cycle. Practical tests of engines under maximum power conditions taught research engineers. exactly when intake and exhaust valves should open, how long they should remain open, and when they should be closed.

It is obvious that a diesel engine is most efficient when its cylinders are completely charged with fresh air prior to each power cycle. This requires that the burned exhaust gases be purged to permit the entrance of fresh air. The process of charging each cylinder with air and purging exhaust gases is what we commonly call the engine's "breathing action." The degree of efficiency with which the engine breathes is termed, volumetric efficiency. If an engine should be capable of charging each cylinder completely full of fresh air, it would be classified as having 100 per cent volumetric efficiency. Today's engine is still a little short of 100 per cent volumetric efficiency; but improved engine breathing through improved valve design and timing, more efficient air intake and exhaust systems are making possible the performance we associate with the modern engine.

The slower water flows through a pipe, the less pressure it takes to move it along. The same is true of air flow into an engine. During operation at the lower end of an operating speed range, the intake cycle occurs less frequently than when operation is at the maximum governed rpm. Therefore the velocity of air passing through the air cleaner, inlet housing, manifold, valve ports, etc., is less at lower speeds. Less air friction is generated, hence lower air intake restriction, as less pressure is required to cause the air to flow. Volumet-

ric efficiency is normally considered somewhat greater in engines operating at the lower end of their normal speed range than at maximum speed.

We readily recognize the importance of valve, air intake and exhaust system design for proper engine breathing. The amount of restriction to free air and exhaust flow contributes to maximum volumetric efficiency. Losses caused by air cleaner, manifolds and other components of the intake and exhaust systems, are classified among known parasitical losses. Except when following procedures for recommended changes, there is very little the service department can do to improve engine breathing other than to be sure valve timing is according to recommended standards, and that proper maintenance procedures are followed. Suffice to say, there are so many factors involving proper engine breathing that each make or type of diesel presents its own set of values. The relationship between bore and stroke, size and number of valves, intake and exhaust systems, and combustion chamber design, are among those that play an important part in breathing. Even valve timing must be carefully chosen to assure best performance throughout a specified speed range.

Service departments can do little in regard to the design of air cleaners, intake and exhaust systems without completely changing the engine's breathing system. Maintenance practices, therefore, to assure air intake and exhaust back pressure within manufacturers specified ranges, are of the utmost importance for maximum horsepower and long engine life. While a dirty air cleaner will restrict the flow of fresh air and reduce volumetric efficiency, excessive exhaust back pressure will have a similar effect . . . both contribute to loss of power.

When engineers first applied their skills to increasing horsepower for any given engine they learned that, by squeezing more air tighter in the combustion chamber before fuel injection, greater power output could be obtained. It was also learned that when compression ratios were raised beyond certain figures the engine's power did not increase in proportion to the pressure increase. Therefore, a point of diminishing returns was

reached and beyond certain ratios, engine efficiency did not increase. It is impossible to state definite established boundaries, relative to the limits of compression ratios, within which all engines will be found. The compression ratios of engines will vary from 12:1 to as high as 22:1, and even 25:1. This wide variation is due to the many variables in design characteristics, such as combustion chambers, fuel systems, and engine applications.

To cause any engine of a given size to develop more power, we must plan to convert more of the potential heat energy of fuel burned to mechanical heat. This can only be done if we realize one or more of the following accomplishments:

- By increasing the volumetric efficiency we put more air into the combustion chamber; by so doing, we can burn more fuel and obtain more complete combustion.
- By increasing the compression pressure to a more desirable value, more of the potential heat energy from fuel can be converted to mechanical power.
- 3. By increasing both volumetric efficiency and compression pressures, we can squeeze more air into a smaller area, inject more fuel, capture more of the potential heat energy and show a noticeable increase in horsepower.

Modern research and development has not been able to utilize all the heat developed during combustion for effective power. Actually we are forced to dissipate much of the valuable heat developed. If we did not do so, serious damage would occur. A considerable portion of the generated heat is dissipated to the cooling system; an additional large amount of heat is lost to the exhaust system; and the lubrication system. In discarding this heat, we are throwing away much of the potential energy of fuel. Even so, the diesel engine is the most efficient form of internal combustion engine. Experience gained by actual field service and by millions of aggregate hours of under load testing under controlled conditions in research laboratories is leading the way to better, more efficient operation through, 1-improved volumetric efficiency, 2-more effective compression pressure, and 3more complete combustion.

Fairbanks-Morse Appointments

Warren A. Logelin has been named vice president in charge of public relations and advertising at Fairbanks, Morse & Co., it was announced by Gordon R. Anderson, executive vice president. Mr. Logelin succeeds Blair Bolles, who has been elevated to vice president, assistant to the president. Mr. Logelin was director of public relations





W. A. Logelin

Blair Bolles

at Acme Steel Company, Riverdale, Ill. before his latest appointment. Prior to that he was director of public relations and advertising for Crane Co. and the Chicago Association of Commerce and Industry. He also was director of advertising for the Chicago Transit Authority for many years. He is public relations chairman for the Illinois Manufacturers Association and the Chicago Association of Commerce and Industry. He is a past president of the Public Relations Clinic, an organization of corporate public relations directors in Chicago. Mr. Bolles had been vice-president, public relations, since 1959, when he joined Fairbanks-Morse from The Blade, Toledo, Ohio, for which he had successively been European correspondent and associate editor. He is a former Washington newspaperman and was director of the Washington bureau of the Foreign Policy Association. He is the author of several books, the latest of which, "Men of Good Intentions," dealing with the American presidency, was released by Doubleday at the time of the 1960 nominating conventions.

Heads Cooper-Bessemer Development



M. J. Helmich

Appointment of M. J. Helmich as chief engineer of the development division, The Cooper-Bessemer Corp., has been announced. Mr. Helmich will fill the position vacated by W. R. Crooks who retired August 4, after more than a quarter century in the heavy duty diesel and gas engine

development field. Replacing Mr. Helmich as assistant chief development engineer will be G. A. Dorton. Mr. Crooks will continue his association with the corporation in the capacity of development consultant.

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- 4,000 pounds of steam per hour heats the crude oil to separate water and sludge from oil.
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St. Lawrence Tour Boat



Believed the largest all-aluminum passenger carrying vessel in this country, the American Venus has entered the service of the American Boat Line, operating in the Thousand Islands area of the St. Lawrence River. She is running a daily schedule of three hour sightseeing cruises, out of Clayton, N. Y., winding in and out of the island waterways. She was designed by Sparkman and Stephens and built by Paason Marine Service of Erie, Pa., and is 67 ft. overall. Her beam is 19 ft. and she draws only 4 ft. of water. Maximum speed is 17 mph. The choice of aluminum produced a material saving in weight, estimated at approximately 12 tons less than a steel vessel of comparable size. This enabled attainment of the desired speed with a smaller and lighter power plant (twin 336 hp 8V-71 GM diesels) than would otherwise have been necessary, thus accomplishing a dual purpose; a further saving in weight contributing to the desired speed, and significant fuel economy.

Cooper-Bessemer Odessa Manager



O. W. Stanley

O. W. Stanley has been named branch manager of The Cooper-Bessemer Corp.'s Odessa, Tex. branch office. Mr. Stanley will direct Cooper-Bessemer's field sales and service activities in the West Texas area. He fills the post vacated by C. L. McDougall, who has been named

assistant parts sales manager of the company.

8 Diesels in Dodge Line

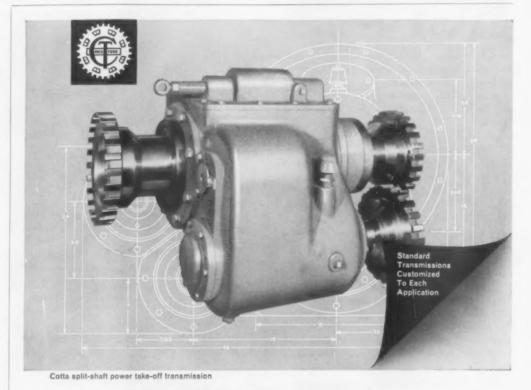
Eight diesel engines, with a horsepower range from 160 to 250, are available in the 1961 Dodge truck line. Gross vehicle weight ratings on the new trucks range to 53,000 pounds and gross combination weight ratings to 76,800 pounds. Another highlight of the new trucks is a 35-ampere alternator which replaces the conventional gen-

> Turbocharged Cummins C-175 diesel engine powers this Dodge KC-700 tractor. Engine develops 175 hp with displacement of 464 cu. in.



erator. The alternator system consists of an alternator and rectifier assembly and a voltage regulator. The alternator produces alternating current, which the rectifier converts to direct current. The regulator controls voltage from the alternator. The introduction of four Cummins diesel engines headlines advances in the high-tonnage field. While retaining the turbocharged C-175 and the naturally-aspirated NH-180, NH-195, and NH-220 diesels first offered in 1960, Dodge is adding the C-160, NHE-180, NHE-195, and NH-250 engines. The NHE diesels, designed to provide high economy, feature a displacement 10.5 per cent larger than the NH engine of equivalent horsepower. They develop the same horsepower and greater torque than their NH counterparts, but at a lower rpm.

As a result, properly-geared NHE units are expected to run more miles with less maintenance as they turn fewer revolutions-mile than their NH counterparts. The NHE-180 produces 180 hp and 534 lb. ft. torque in a displacement of 748 cu. in., and the NHE-195 produces 195 hp and 580 lb. ft. torque in a displacement of 743 cu. in. The C-160, rated at 160 hp, develops 376 lb. ft. torque in a displacement of 464 cu. in. It is designed for stop-and-go operations. The NH-250 produces 250 hp and 685 lb. ft. torque in a displacement of 855 cu. in. It is designed for heavyduty turnpike operation and in areas where steep grades must be negotiated. A new 12-speed Spicer transmission is offered on models NC-900, NC-1000, NCT-800, NCT-900, and NCT-1000.



Use full engine power for truck travel or auxiliary equipment with Cotta split-shaft power take-off

Need truck mobility to transport auxiliary equipment quickly . . . plus full engine power for pumps, winches, electric sets, and compressors after they arrive on the job?

Cotta's split-shaft power take-off transmissions lead full engine horsepower to rear axles, or to auxiliary equipment when heavy loads demand it. Auxiliary engines can be eliminated. Reduced gear loads and constant mesh gears on both shafts prolong equipment life.

PTO flexibility - Standard truck transmission ratios combine with Cotta's splitshaft ratios to provide exceptional drive

flexibility for road travel or PTO performance. Customized gear-ratio variations are available for individual jobs.

Parts availability - Guaranteed Cotta parts and service keep your equipment on the job. Round-the-clock expediting of gears or shafts means delivery in hours after your order is received.

See our catalog in Sweet's Product Design File. Check the descriptions of standard and custom applications. Then call Cotta (TWX-RK 7720 or phone WO 4-5671) for complete details.











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4. ACCESSORY EQUIPMENT — Recent developments in fuel injection systems,

governors, and other key accessory units are detailed and illustrated fully in this section.

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Delco-Remy Sales Offices

A new regional sales office established by Delco-Remy Division of General Motors at Milwaukee, Wisc. will be headed by John R. Mail. Mr. Mail, who for the past year has served as regional sales manager in charge of the Delco-Remy Detroit office, will be succeeded in that post by Paul Timmerman. The Mil-

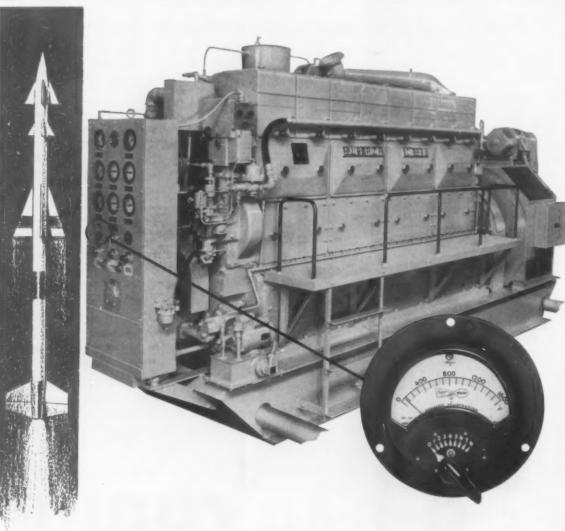
waukee sales facility is located at Hales Corner, a suburb of the metropolitan city, and began operation in July. In addition to its Detroit office, the division also has recently opened an office in Beverly Hills, Calif., serving the West Coast area. Named as sales engineers assigned to the Milwaukee office are R. E. Coates, C. F. Singer, Don R. Bogue and K. E. Harmas.

Allis-Chalmers Buys French Diesel Manufacturing Firm

Allis-Chalmers Manufacturing Co. recently announced purchase of the controlling interest in a French firm which manufactures air-cooled diesel farm tractors, industrial engines, and enginegenerator sets. The name of the French company is Etablissements de Constructions Mecaniques de Vendeuvre, S. A. Pierre Lancrenon continues as director general of the new organization. The firm will continue to produce its current line of equipment and distribute it through its own sales organization in France and through Allis-Chalmers International to other world markets. With headquarters in Paris, the French firm operates two plants, employing approximately 1,000 people. At the Dieppe plant, located on the English channel about 100 miles north of Paris, aircooled diesel engines and engine-generator sets are manufactured. Tractors are assembled at the other plant located in Vendeuvre, a town about 100 miles southeast of Paris from which the company derives its name. Established in 1837, the firm is one of the oldest manufacturers of farm equipment in France. Financial details of the transaction were not disclosed. Allis-Chalmers International is the sales organization for all of the company's products outside of the United States and Canada.

EMD Traveling "Report"

The fifth progress report to the nation's railroads-soon to chalk up its 100,000th mile-opened at Bangor, Maine, on September 19, on the first stop of a 47-city tour. Announcement of the dates and the tentative schedule for other progress report appearances was made by Victor E. Rennix, general sales manager, Electro-Motive Division of General Motors, LaGrange, Illinois. Mr. Rennix said this year's report-featuring displays and presentations on the latest developments in motive power and locomotive components, will be presented to 152 railroads before its last showing March 20, 1961 at Duluth, Minn. Four previous railroad progress reports have covered more than 80,000 miles. Rennix said the progress report this year will highlight design and engineering changes in locomotive truck, traction motor and 567C diesel engine components. Included in this year's program will be detailed stories on double coil truck springs, traction motor gear case improvements, traction motor support bearings, constant pressure brush holders, centrifugal spark arrestor manifolds, improved fuel filtration systems, needle valve injectors and parts packaging improvements. A revolutionary "skin-pack" process for gaskets now is being used by Electro-Motive.



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On guard 24 hours a day to assure maximum efficiency in operation and smooth power from this White Diesel generating unit in Atlas ICBM rocket launching sites.

A turn of the knob on the Alnor Pyrometer will give an instant check on the operating efficiency of each cylinder by indicating the individual exhaust temperature.

Improper injection, blow by, stuck rings,

failure of cooling, overload or other malfunctioning of the engine can be immediately detected and corrected before serious damage is done. This is why most diesel power plants today are Alnor equipped.



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Engineering Index Catalog

The Engineering Index has been serving the engineering profession in the complex task of keeping abreast of all developments in all branches of engineering. At the outset the task was relatively simple, compared with today's great volume of printed matter developed to the myriad mass of complicated processes and materials used in engineering. When The Engineering Index began there were three fundamental branches of engineering. Now specialization has made necessary many branches of engineering subdivided by The Engineering Index into 249 Divisions. Today The Index is reviewing over 700 engineering and technical periodicals published in 44 countries, plus another thousand printed in the United States. In order to review and annotate this enormous mass of material it has been necessary to develop a staff of editors who are engineering linguists, competent to select and translate into English what developed to be a total of 34,000 abstracts in 1959. Selection is made on the basis of articles dealing with the science and art of engineering. Articles on pure science, economics, commerce and trade; editorials, news items, notices of meetings, trade announcements, and the like, are included only when considered of primary importance. The bound volume of the Index issued this summer contains a 12-page list of technical publications received by The Engineering Index, and 96 pages devoted to an Author Index. In addition to the bound volume, The Engineering Index issues a daily or weekly card index service to assist those wishing to keep strictly up-to-date with a rapid review of each development in any and all of the 249 divisions of engineering-thereby enabling subscribers to receive only the particular portions of the entire service which fit their requirements. Subscriptions cost from \$12.00 to \$45.00 annually for each of the 249 Divisions of Engineering selected by the subscriber, and received by him weekly. A complete catalog fully describing the coverage is available without charge on request from Engineering Index, Inc., 29 W. 39th St., New York 18, N.Y.

New Fuel Filter Line

A new compact fuel filter, first in a new standardized series of filters for light hydrocarbons, has been introduced by Purolator Products, Inc. Specially designed to meet filtration needs of truck and marine service stations, the new filters consist of a pre-formed cellulosic element which is accordion pleated to provide greater filtering area. Weighing slightly over 10 lbs., the filter has a steel casing plated internally to prevent any corrosion. The new filter, which meas-

ures approximately 13 in. in length and $7\frac{1}{2}$ in. in diameter, can operate effectively at a maximum operating pressure of 25 psi and a maximum operating temperature of 200° F. Drain plugs are provided for periodic drainage of sump contaminants. Each case has a capacity of two quarts. Initial pressure drop varies with different fuels, the highest being a drop of 3.5 psi at a rate of 25

gpm for #2 diesel fuel at 80° F. Designated the PAG 25-D series, the filters can be mounted as "line" type or on brackets when used on diesel engines. The element can be replaced by dropping the casing from the filter head and inserting a new element. For further information on the new PAG 25-D filter write: PUR 169, Purolator Products, Inc., Rahway, New Jersey.

A-C Names Three

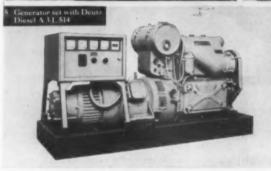
Allis-Chalmers Industries Group has announced the following appointments: Marvin A. Bail, assistant engineer, motor and generator department; Donald Powichroski, application engineer, switchgear department, and Marquis B. Robinson, engineering scientist in applied research.













Dynamic Deutz Diesels are equally at home in front-end loaders, compactors, marine vessels, power plants, generators or ore carriers. There is a wide range of both air and water-cooled diesels. Unequalled reliability, rugged

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Woodward Governor Conference

Woodward Governor Co., Rockford, Ill., producers of hydraulic governors, held their twenty-fourth annual Prime Mover Control Conference in the Woodward plant September 6th through 9th. Objectives of the conference were to acquaint conferees with the theory and

the fundamental principles of hydraulic governor design and operation. Classes were devoted to such subjects as design, application, maintenance and operation of hydraulic governors for internal combustion engines; hydraulic, steam and gas turbines; and aircraft propellers. The conference got underway with a welcome address by Irl C. Martin, president of Woodward. Bill Whitehead, vice

president in charge of sales, outlined Woodward products and services. Billy Bittle, general manager, told of the aims and objectives of the conference. Following a short break, G. Forrest Drake, vice president of engineering, provided an introduction to Woodward governors. Technicians from the world over attended as did men from a wide array of major U.S. companies.

D. J. Cummins Takes Leave of Absence

D. J. Cummins, vice president-engineering, will take a leave of absence from Cummins Engine Company, Inc., after forty years of service. This announcement was made by E. Don Tull, Cummins president, who said Mr. Cummins will continue to serve the company in a consulting capacity. Mr. Cummins, who has been with the company since its inception in 1919, has held many positions throughout his 40 years with Cummins including those of laboratory manager, manager-engineering, quality control manager, managing director, Cummins Engine Company, Ltd. in Shotts, Lanarkshire, Scotland, and vice president-engineering. He was one of the company's first field service representatives. During those early years, he travelled the country on application and engineering work. Later, as Quality Control Manager, Mr. Cummins established the present quality control systems which the company now uses. In 1956, when the decision was made to start manufacturing engines in Shotts, Scotland, Mr. Cummins was placed in charge of this overseas operation and he resided in Scotland until July, 1957. During this time, the plant was set up and initial operations started. In addition, by continuing his association with the company through his consulting function, Mr. Cummins will, as President Tull put it, ". . . enable the company to continue use of his many years of experience in the diesel field."

A-C Organizes Regions

The organization of six construction machinery sales regions and the creation of the new position of general products manager within the construction machinery division of Allis-Chalmers Manufacturing Company has been announced. The firm said it was establishing separate sales regions designated geographically as Northwest, Western, Central, Eastern, Southern and Northeast. Each region covers the sales territories of two Allis-Chalmers construction machinery branch offices. Heretofore, there were two regions, Eastern and Western, covering six branch office sales territories each. As part of the organizational change, H. T. Larmore has been appointed to the newly created position of general products manager of Allis-Chalmers construction machinery division. In this capacity Larmore will coordinate the sales activities with engineering and manufacturing of Allis-Chalmers line of construction machinery products produced at the firm's Springfield and Deerfield, Illinois and Cedar Rapids, Iowa plants. Prior to his new appointment Larmore had been sales manager for crawler tractors and motor graders.



Use the AUTOLITE CO-AX on your farm, marine, construction equipment, trucks, cars, diesel and industrial engines. Check its many design advantages, its plus values.

MORE COMPACT. Shifting solenoid located inside pinion housing coaxially with clutch. No external elements to interfere with engine or accessories.

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LONGER USEFUL LIFE. The reduced engagement clash means less wear, greater length of service.

EASIER SERVICING. By simple removal of screws switch comes off and is replaceable as unit.

PERFORMANCE RANGE. Co-Ax motors for diesel and large gas engines are

conservatively rated on SAE standard and heavy duty battery curves as follows:

12 volt motors

2.4 hp, 28 lb. ft. stall ... to ... 3.6 hp, 44 lb. ft. stall

24 volt motors

2.8 hp, 35 lb. ft. stall . . . to . . . 6.5 hp, 78 lb. ft. stall

Smaller Co-Ax motors are also available with range of performance for automotive, agricultural and industrial engines. For additional information, write: Autolite, Toledo 1, Ohio.



ELECTRICAL PRODUCTS DIVISION Toledo 1, Ohio



Aluminum Cuts Rig Weight

Extensive use of high-tensile aluminum sections, instead of steel, marks the construction of two trailer-mounted National T-20 rigs ordered by the Arabian American Oil Company for slim-hole exploratory drilling in Saudi Arabia. Each rig is mounted in a triple-deck trailer that carries all the units except the mud system, pipe rack, and ramp. All supply lines for fuel, water, and air. as well as the mud supply line, are built into the trailer. Accessories include a built-in standpipe, tong counterweights, tong line rollers, and highline sheave. Other equipment supplied includes a Type \$30-D-90 Hookblock and a Type N-24 Swivel. Aluminum is used for eight stairways, the fuel tank, driller's doghouse, wire rope storage reel, racking platform, ladders, crown top platform of the mast and various structural members in the trailer assembly, with a weight-saving estimated at 20,000 lbs. Although the extensive use of aluminum in place of steel is more costly. there are compensating advantages in operation, maintenance, and transportation. With its mast folded down for transportation, each rig is 68 feet long. 16 feet wide over the wheel tracks, and 22 feet high. With the walkways and doghouse in operating position, width is increased to 24 feet. Over-all weight of each trailer and its equipment is approximately 170,000 pounds. The power drive group, consisting of three General Motors model 6082 series 71 diesel engines, each equipped with a GM torque converter, and one slush pump, are located on the lower deck. On this level also is a centrifugal pump, used for general rig water service, washdown, etc., and a centralized control panel for the electrical equipment. A 94-foot Lee C. Moore Mast and a GM diesel-generator set, an air compressor set, and the fuel tank, are located on the top deck. The running gear for desert transport consists of two dollies, each having four 25 x 15.00 wheels with 21 x 25 tubeless tires, and complete with air brake equipment. On location, each trailer is supported on eight jacks based on aluminum bearing sills to keep ground pressure at a minimum.

Service Directory

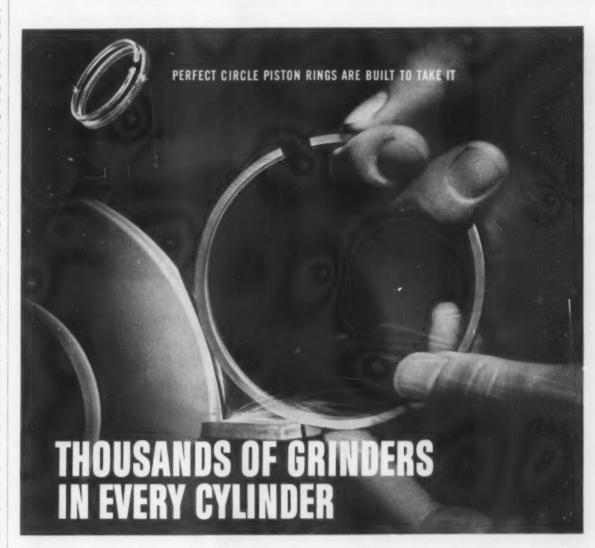
A directory of world-wide sales, service and parts outlets for Detroit Diesel engines has been prepared by the factory for truckers, contractors, oilwell drillers, yachtsmen and others whose equipment is constantly on the move. Over 600 outlets in the United States, Canada, Mexico and overseas are listed by state, province and country, giving addresses, and in most instances telephone numbers, that can be called day or night for parts and service. A copy of the directory can be obtained without charge by writing

Detroit Diesel Engine Division, 13400 W. Outer Dr., Detroit 28, Mich. for Directory 8SA48.

Buy 20 Kenworths

Wells Cargo, Inc., is taking delivery on 20 new Kenworth Highway trucks for use on the firm's common carrier service between Central California and Nevada. Seventeen of the new trucks are conventional, three-axle Model 925's, and three are cab-over-engine, two-axle Model K-521's. All are powered by Cummins NH-250 diesel engines. Wells Cargo, Inc., is active in a wide variety of trucking operations, including, in addition to its common carrier service, heavy-duty road building and numerous mine operations.

READY NOW! The completely new 1960 edition of the DIESEL AND GAS ENGINE CATALOG, Volume 25, can now be purchased. If you design, purchase, sell, operate or service diesel, dual fuel, or gas engines, the Catalog is essential to you and your business. This giant, 442 page, 10½ x 13½", fully illustrated reference book has been rewritten, revised and brought up to date completely from cover to cover and costs just \$10 postpaid anywhere in the world. Send checks, money orders or company orders to DIESEL AND GAS ENGINE CATALOG, 9110 Sunset Blvd., Los Angeles 46, Calif.



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Michigan-Ohio News

By Jim Brown

JIM Van Assche of Dearborn, Mich. has accepted delivery on a new International TD-6 crawler equipped with a hydraulic bulldozer blade. Sale was made by Wolverine Tractor & Equipment Co., Detroit and Grand Rapids.

LEROY Golm of Earle Equipment Co., Detroit, has been promoted from assistant sales manager to Engine Sales Manager. Earle Equipment Co. is setting up a special division to cover Allis-Chalmers single engine sales and generator sets. Howard Anthes will succeed Golm as assistant sales manager.

A Jaeger model 600 air compressor powered by a GM 6-71 diesel was recently delivered to John Meagher of Bay City, Mich. Sale was made by Cyril J. Burke, Inc. of Detroit.

J. R. Panelli Equipment Company of Southfield, Michigan has recently sold a model W-3 Case front-end loader. The new loader is equipped with a backhoe and is powered by a Case model D-188 diesel rated 52 hp at 2100 rpm. The unit was purchased by DiMichele Bros. of Roseville, Mich.

MILLER Equipment Co. of Livonia, Mich. has recently delivered a Michigan model 175A 31/4 yd. tractor-shovel to Michigan Foundation Co., Trenton. The new loader is powered by a Cummins C-175 (162 hp) engine.

R. L. Coolsaet Construction Co. of Dearborn, Mich. has accepted delivery on an International TD-9 equipped with a hydraulic bullgrader and a model E-24 Carco Winch. The sale was made by the Detroit branch of Wolverine Tractor & Equipment Co.

JAMES Sulata of Marlette, Mich. has

accepted delivery on a new Allis-Chalmers model HD6B bulldozer. The sale was made by Earle Equipment Co. of Detroit.

CYRIL J. Burke, Inc. of Detroit has sold a model 340D Pettibone-Mulliken 3-yd. front end loader powered by a Cummins C-160 diesel engine. The unit was purchased by Fenton Gravel Co. of Fenton, Mich.

HURON Portland Cement Co. of Alpena, Mich. has accepted delivery on a Michigan model 280 'dozer powered by a 265 hp Cummins model NTO-6-BI diesel engine. The unit was purchased from Miller Equipment Co. of Livonia, Michigan.

THE City of Grand Rapids, Mich. has purchased an International TD-15 crawler tractor from Wolverine Tractor and Equipment Co.

TELFORD Equipment Co. of Detroit, Mich. has sold an Adams 440 motor grader to Oakland County road commission. The grader is powered by a GM 4-71 diesel, has 8 forward speeds, power steering, 12 ft. power shift mold board and weighs 25,000 lbs.

CONSUMERS Power Company at Essexville, Mich. has accepted delivery on an Allis-Chalmers model HD11E with a model 11HA angle dozer blade. The new dozer will be used on Consumer's coal pile and was purchased from Earle Equipment Company.

PENINSULAR Diesel Inc. of Detroit has installed a model 5067-5240 GM diesel in a 1958 Dodge truck for Lawrence Sinney of Midland, Mich.

VENICE Construction Co. of Hazel Park, Mich. has accepted delivery on a model 41 Northwest pull shovel (1 yd.) powered by a Murphy model 12 diesel engine. The new Northwest will be broken in on a sub-division in Grosse Pointe Woods and was purchased from Cyril J. Burke Inc. of Detroit.

PROPER & Saylor of Pontiac, Mich. has accepted delivery on a model W-3 Case combination loader and backhoe. Powered by a Case model D-188 diesel, the new loader was purchased from the J. R. Panelli Equipment Co. of Southfield, Mich.

MILLER Equipment Co. has sold a model 280 Michigan 'dozer to Blue Water Excavating Co. of Port Huron, Mich. The new dozer is powered by a Cummins NTO-6-BI diesel engine.

THE City of South Haven, Mich. has accepted delivery on an International TD-9 crawler with a Drott 4-in-1 buck-

et. Sale was made by Wolverine Tractor & Equipment Co.

TELFORD Equipment Company of Detroit reports the sale of two model "C" LeTourneau-Westinghouse "Tournapulls" powered by GM 8V-71 diesel engines. The Tournapulls were purchased by S. G. Carter of Detroit.

TOM Robinson & Son of Jackson, Mich. has accepted delivery on an Allis-Chalmers model HD6E crawler with hydraulic dozer blade. Sale was by Earle Equipment Co.

CYRIL J. Burke Inc. reports the sale of a 40 ton erection crane—Northwest model 6—powered by a Murphy model 12 diesel engine. The unit was purchased by Charles J. Rogers Construction Co. of Detroit.

Reopen Halifax Warehouse

In a move to meet a growing market demand for its marine gas and diesel engines, Cooper-Bessemer of Canada, Ltd., has reopened its Halifax, Nova Scotia warehouse. The move was announced by C. R. Jones, vice president of the company, a division of The Cooper-Bessemer Corp. of Mount Vernon, Ohio. In 1958, the warehouse facility was closed because of a depressed condition in the diesel and gas engine market, and the facility was relocated to Gloucester, Mass. Subsequent market expansions, however, have created a permanent need for a Cooper-Bessemer warehouse in the Halifax area. It is anticipated that the Halifax facility will eventually house gas and diesel engines to be produced at the company's newly leased manufacturing facilities at Stratford. Ontario.

"Decoy" Turbine Contract

A new \$1,300,000 contract for production of an AiResearch air turbine generator for the McDonnell-built Quail (GAM-72) decoy missile has been announced. Previous contracts totaling nearly \$2 million for the units are already being filled, according to J. J. O'Brien, manager of The Garrett Corp.'s AiResearch Manufacturing Division, Phoenix, Arizona. The 33 lb. units, mounted in the B-52 launched diversionary missile, supply \$.5 kva alternating current. This current powers both the missile's classified bomber simulation equipment, and navigational controls. Over half the ATG's weight is in its 115/200 volt permanent magnetic field generator. This is directly driven by a single disc, outward-flow turbine at 24,000 rpm. Essentially constant frequency is maintained by a special AiResearch speed control metering bleed air flow from the Quail's J85 jet engine.















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Diesel engine manufacturers, their designers and engineers are specifying ROOSA MASTER because they know that it is the most versatile. There are many reasons for selecting this pump. Here are just a few:

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DIVISION OF STANDARD SCREW COMPANY

New Lube, Grease Additive

Development of a new additive to combat high-temperature deterioration of lubricating oil and reduce bearing corrosion has been announced by Universal Oil Products Co. Designated UOP-225, the additive is stable at temperatures above 500° F, and leaves no combustion ash. It is completely soluble in petroleum and synthetic lubricants. First applications of the new additive probably will be in heavy duty greases, UOP predicts. Recommended dosages are one to two per cent for diabasic acid or polyol derived lubricants to meet MIL-L-9236A specifications and one-half to one per cent for MIL-L-7807 oils. Advantages of the new additive include corrosion protection for all bearing metals plus titanium, aluminum and magnesium. The inhibitor is compatible with common lube and transmission oil detergents and is also suitable for diesel oils, UOP said. Further specifications can be obtained from Universal Oil Products Co., 30 Algonquin Rd., Des Plaines, Ill. (ITS NEW)

Elliott Names McLaughlin

The Elliott Co., a division of Carrier Corp., announced appointment of R. Wayne McLaughlin to the position of general manager of its Ridgway, Penn. operation. Mr. McLaughlin graduated from Iowa State College in 1929 with a degree in mechanical engineering. Joining Elliott in 1934, he worked in both the turbine and compressor engineering departments. In 1945, he went to Carrier Corp. as director of heavy compressor development. Following the merger of Carrier and Elliott, he was appointed a vice president of Elliott Co., and manager of the engineering department at the mechanical operation in Jeannette,

Drug Firm Utilizes Diesels

Boots Pure Drug Co., retail and manufacturing chemists, have now 51 Perkins-engined lorries and vans in their big transport fleet, which covers 21/2million miles every year delivering goods to the company's shops. The Perkins-powered vehicles, based at Nottingham, Beeston, London and Airdrie in England are giving "extremely satisfactory" service, reports Mr. F. G. Bell, the company's general transport manager. Mr. Bell has informed Perkins Engines Ltd. that six cylinder Perkins P6 engines in the Boots fleet repeatedly complete mileages of 300,000 and that four cylinder P4 units are still going well after attaining mileages of 265,000. The six cylinder Perkins engines, operating in six ton lorries and vans, cover 20,000-30,000 miles annually. The engines are overhauled after 160,000 mi. and are disposed of after 300,000 mi.

Fitted in three ton vans, the four cylinder P4 engines cover 40,000 miles a year and regularly average 25 mpg. Rebored in the chassis between 130,000-150,000 miles with an overhaul at 230,000 miles, they are expected to complete 350,000 miles. Boots, who have factories at Nottingham, Beeston and Airdrie and 1,300 shops in Britain, are at present trying out two 15 cwt Commer vans with Perkins 1.6 litre Four 99 diesel engines.

Napier Appointment

Mr. P. J. Daglish has been appointed special executive responsible to the managing director of D. Napier & Son Ltd., London, Mr. Daglish joined English Electric in 1946 and prior to joining D. Napier & Son Ltd. was manager of English Electric's Aircraft Equipment Division at Bradford. In this post he has been responsible for the establishment of the division which is now providing a wide range of equipment for aircraft being built in Europe and the USA. During this time the Division has introduced into Britain the use of constant frequency A.C. electrical systems in aircraft.

Heads Lakes Association

Joseph F. Deane was elected president of The Great Lakes Ship Owners Association and John H. Eisenhart, Jr. was elected vice president and general counsel following the annual membership meeting at St. Clair, Mich. Mr. Deane is a member of the board of directors of Nicholson Transit Co. and also operates the East Detroit Stevedore Co. and the Automotive Division of the Nicholson Transit Co. Mr. Eisenhart, a prominent Washington attorney, has for many years represented the common carrier steamship association in legal and legislative matters affecting the membership. Also at the annual membership meeting of the Association which considered legislative and legal prospects facing the common carrier Great Lakes vessel operators the Board of Trustees of the Association elected the following officers: Arthur C. Sullivan, Jr. (Gartland Steamship Company) vice president; and A. B. Cozzens (Oglebay Norton Company-Columbia Transportation Division) secretary and treasurer.

Hydraulic Accumulator Bulletin

A newly issued folder explains why and how accumulators are used in a wide variety of hydraulic systems. Included are description and technical data on Parker piston-type accumulators ranging in capacity from 10 cu. in. to 10 gals. Ask for bulletin 1530B1, available from Parker Hydraulics Division, Parker-Hannifin Corp., 17325 Euclid Ave., Cleveland 12, Ohio.

Synchronous Generators

BEMAC (the Brushless Exciter Magnetic Amplifier Controlled) "packaged" synchronous generator is featured in product publication 2100-PRD-255A. BEMAC has a 6.25 - 187 KVA, single or three phase output, 80% P.F., and runs at 1200 and 1800 RPM's. Standard voltages, 120/208, 240/416, 480 Volts (12 leads brought out for selection of voltage), are available at a 60 cycle frequency. The new bulletin describes low maintenance features and the overall design and construction of these synchronous generators. Copies of the new bulletin are available by writing Electric Machinery Mfg. Co., Minneapolis 13. Minn. (ITS NEW)

Cylinder, Drill Unit Catalog

A new two color 24 page catalog is available from the Alkon Products Corp. on its line of cylinders, drill units and valves. This catalog has been designed

to provide an easy-to-read, single reference source on the firm's line of pneumatic and hydraulic components. Included in the material is product data and specifications, schematics, price lists and discount schedules. An added feature is the introduction of the new Series B inter-changeable cylinder for air and oil service. Copies are available by writing to Alkon Products Corp., 200 Central Ave., Hawthorne, N.J.

(ITS NEW)

New Service Division

Allied Metal Hose Co. has announced formation of its new Heating, Airconditioning, and Piping Division. The new division is specially staffed and equipped to service mechanical contractors, engineers, consultants, and others who use or specify flexible connectors to control pipeline motion. A nation-wide field engineering sales force is being organized for consultation.



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Turbine Economics Brochure

The economics of gas turbine power generation for U.S. Defense sites and for commercial applications are discussed in a new bulletin just issued by Clark Bros. Co. Major factors such as installed cost, fuel, operating cost and the time value of money are thoroughly reviewed with the help of charts and graphs. The brochure concludes with a description of the special characteristics of the gas turbine which make it suited for defense and commercial applications. Copies of Bulletin 202 can be obtained by writing to Clark Bros. Co., Olean, N.Y.

(ITS NEW)

Institute Adopts New Name

The Welded Steel Tube Institute, Cleveland, Ohio, is the new name for an organization representing more than 20 manufacturers of welded steel tubing. The organization, founded in 1930 as an advisory group for the industry, was formerly known as the Formed Steel Tube Institute.

New General Catalog

Release of a completely new general catalog is being announced by the Young Radiator Co. The 32 page, three color catalog comprehensively covers Young radiators, heat exchangers, supercharger air coolers, industrial and oil field equipment and heating and air conditioning products. Information includes a brief history of the company, an illustrated description of Young Radiator's location, facilities and services, and a complete product resumé including installation photos. A presentation of scientific, nuclear heat transfer applications stressing technical research developments to meet the requirements . of the atomic era complete the contents. Request Catalog 160 by writing Young Radiator Co., Racine, Wis. (ITS NEW)

Mid-West Diesel News

By L. H. Houck

SOUTHERN Plaza Express, Inc., Dallas, has 27 new International DCOT-405's with Cummins engines, RoadRanger transmissions.

JEFFERSON county highway dept., Wisconsin, a GM 6-110 for powering a Cedarapids Commander rock plant. Delivery by Inland GM Diesel, Inc., Milwaukee, through Adams Machinery Co.

INTERNATIONAL model 295 Payscraper, 34 yd. capacity to C. C. Mangum, Inc., Raleigh, N.C., for use on highway contracts. This new unit features 375 hp turbocharged International DT-817 diesel and 4 speed Allison CLT5840 planetary-type, torque converter power shift transmission and Torquatic braking.

INTERNATIONAL Drott TD-15 skidshovel with IHC 85 hp diesel, to Mississippi Valley Eng. & Const. Co., Memphis.

TD-15 International to A. G. Pinkston Co., Portsmouth, Va., prime contractor in laying 4,000 ft. of 24 in. reinforced concrete pipe at Norfolk for Virginia Highway Dept.

DAN DUGAN OIL Transport Co., Sioux Falls, S.D. 24 International diesel tractors in a fleet conversion program.

SCHWERMAN Trucking Co., Milwaukee, 125 White 4400-TDL tractors with Cummins diesels for hauling bulk cement in trailers.

REIN, Schultz & Dahl, Madison, Wis., a 6081C GM 6-71 for installation in a Lorain crane, from Inland GM Diesel, Inc., Milwaukee.

INTERNATIONAL TD-15 crawler to Charles Hailey, Stigler, Okla., for oil rig excavation work, involving clearing sites and excavating slush and reserve pits.

CRONER, Inc., Berlin, Pa., is using an International TD-25 for stripping overburden on coal seams. New TD-25 is a 230 hp turbocharged IHC diesel outfit, 4 speed TC, with full-power turns from "Planet-Power" steering.

BROWN & Root Corp., Houston, heavy construction contractors, operating nationally, 23 International TD-15's with IHC 105 hp diesels.

JACKSON Lumber Harvester Co., a GM 4031C diesel power unit from Inland GM Diesel, Inc., Milwaukee, for installation on a portable sawmill. CHANDLER Materials Co., Tulsa, Okla., has taken delivery on an International model 65 Payhauler for transporting blasted limestone from quarry to crusher. The unit has 19 ton capacity and uses the new International D-817 diesel, 250 hp, direct-start, direct-injection, displacing 817 cu. in. Transmission is 10 speed constant-mesh, 17 inch clutch, enclosed power steering.

GM 6-110 diesel, Model 62406RD for installation in a crushing plant to Burleigh Sand & Gravel Co., Milwaukee, from Inland GM.

RINGSBY Truck Lines, Denver, 15 model C-923 Kenworth tractors with Cummins NH-220 diesels.

H. & M. Trucking Co., St. Clair, Mo., Mack with Thermodyne diesel for general over-the-road hauling from Mack dealer, Bob Boedeker, Troy, Mo.

WILLIS Shaw Frozen Express, Inc., Elm Springs, Ark., 10 Kenworth tractors with Cummins diesels.

AN International TD-9 with International 66 hp diesel to the municipality of Colonial Hts., Va., for loading trucks.

ROPER Ford Industrial Products, Inc., 7501 Manchester St., St. Louis, is dealer for new Ford diesels, with 220 and 330 cu. in. engines in stock. New engines feature 12 volt electric starting, wet cylinder sleeves, rotating exhaust valves, 4 and 6 cylinders, 60 and 96 hp.

BI-STATE Machinery Co., headed by John O. Ellis, president, St. Louis, is a new distributor for heavy construction machinery. Main heavy line is LeTourneau-Westinghouse.

Speed Reducer Book

"Parallel Shaft Speed Reducers" is a new 36-page book that describes Link-Belt's completely redesigned and expanded line of "balanced design" parallel shaft reducers in 57 sizes, including 23 new sizes. Single, double and triple reduction units are available in capacities up to 2,800 hp at high or low output speeds, and ratios up to 292:1. Book 2719 describes the complete line and includes full information for selecting the correct drive for every application. Sixteen pages of rating tables contain thermal and mechanical horsepower ratings for each input and output speed. Load classes are shown for almost 250 driven machines. Overhung loads, extended shafts and outboard bearings, dimensions and actual ratios are included in additional tables. A copy of Book 2719 is available free by writing to Link-Belt Co., Dept. PR, Prudential Plaza, Chicago 1, Ill. (ITS NEW)



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Inland River Reports

By A. D. Burroughs

M/V AMERICA, hailed as the new inland river power champion, nears completion at St. Louis Shipbuilding and Steel Co. for Federal Barge Lines. Four Cooper-Bessemer turbocharged LS-8 diesel engines will furnish the rated 9000 hp.

UNDER construction at Grafton Boat Works, Grafton, Ill., is the 50 x 18 ft. towboat, *Big Iron*, scheduled for late fall delivery to Economy Boat Store, Wood River, Ill. Twin GM Detroit V-12 engines supply the propulsion power.

SOUTH SEAS, reportedly the nation's largest all-aluminum yacht, has been launched by builder Burger Boat Co., Inc., Manitowoc, Wis. Owned by C. F. Johnson, Palm Beach, Fla., the 75 ft. 7 in. craft has two GM Detroit 8V71 engines rated at 336 hp each.

NEWEST towboat addition to the O'Flaherty Harbor Service fleet, Terrace, Ill., is the pretty 55 ft. x 16 ft. 6 in. Linda. Profitable performance is reported from the two GM diesel engines.

A November launching is tentatively scheduled for the new 150 x 42 ft. tow-boat, Oliver C. Shearer, nearing completion at Marietta Manufacturing Co., Point Pleasant, W. Va., for the O. F. Shearer fleet. A pair of GM 498 engines will supply the rated 4000 hp.

GRAFTON (III.) Boat Works is active with five radar control boats nearly completed for delivery to the U.S. Navy. A 300 hp GM Detroit 6-71 engine will provide power for each of the singlescrew craft.

A 45 ft. Navy utility cruiser is scheduled for spring delivery from the Grafton yard. Two GM diesel engines will supply the rated 600 hp.

THE new towboat Alfrieda, a recent production by Meyer Machine and Welding Co., Union, Mo., is seeing service on the Missouri River. The 38 x 12 ft. craft is equipped with a Graymarine (GM Detroit) 6-71 diesel engine rated at 147 hp at 1800 rpm.

TWO D397 Caterpillar engines have been installed on the 75½ x 22¾ ft. towboat, Kings Landing. The newly-repowered vessel serves in the cement traffic for owners Kosmos Towing Co., Kosmosdale, Ky.

AMONG the familiar towboats plying inland rivers under a new name is the Onward. A well-known craft, longknown as the *Paul Blazer* working for Ashland Oil Co., is now performing for Onward Towing Co., Ohio, with 2000 hp from National Superior engines.

IN service on the Ohio and Kanawha rivers is the *Thelma Ann*, a new name for the 37-year-old towboat, *Trojan*. The 83 x 22 ft. Fairbanks-Morse powered craft was purchased by Elk Towing Co., from Jones and Laughlin Steel Corp.

AVOIDING name-confusion with a new sand-digger, the new towboat Joe Lucas serves under the new name, New Martinsville. The 63 x 21 ft. vessel, delivered this year by Barbour Metal Boat Works, St. Louis, to Ohio River Sand and Gravel Corp., has 600 hp delivered from two Caterpillar engines.

ON the Mississippi, the mighty Mark Eastin was at work with 5600 hp supplied by two GM 16-498 engines. Delivered in 1956 by Nashville Bridge Co., the 177 x 42 ft. towboat made headlines as the 'first' of the big-power inland river towboats.

9000 HP Turbine Bulletin

New Bulletin 198, issued by Clark Bros. Co., describes the company's recently introduced 9000 hp single shaft gas turbine. Primary design considerations of simplicity, low first cost, easy access to all areas and high reliability are first discussed, followed by a detailed description of major components. Pictures, illustrations and diagrams highlight important features such as the compact turbine rotor supported in only two journal bearings, multi-stage axial compressor, three stage turbine, special cooling of turbine discs and blade roots, single combustion chamber with two parallel burners, highly accessible, splitshell bearings, and labyrinth type seals of honeycomb construction. Both liquid and gaseous fuel systems are detailed along with descriptions of the controls, protective devices and lubricating system. Copies of Bulletin 198 can be obtained by writing to Clark Bros. Co., Olean, N.Y. (ITS NEW)

Generator Set Brochure

An eight-page brochure entitled "GM Diesel Generator Sets for Standby and Continuous Off the Line Power" has just been released by GM Diesel. Illustrated in color, the brochure contains charts showing technical data on generator sets from 13.5 kw to 260 kw. Technical data includes—maximum kw and kva ratings; information and model numbers for radiator cooled and heat exchanger cooled sets; and engine data for Series 53, 71 and 110, including twins and "V" engines as well as in-

line models. Other sections of the booklet outline specific sales features found in GM Diesel generator sets, warranty information, and a section on GM Diesel's distributor-dealer organization. Copies of the brochure (Form 8SA68) are available by writing to the Advertising Department, Detroit Diesel Engine Division, Detroit 28, Michigan.

(ITS NEW)

READY NOW! The completely new 1960 edition of the DIESEL AND GAS ENGINE CATALOG, Volume 25, can now be purchased. If you design, purchase, sell, operate or service diesel, dual fuel, or gas engines, the Catalog is essential to you and your business. This giant, 442 page, 10½ x 13½", fully illustrated reference book has been rewritten, revised and brought up to date completely from cover to cover and costs just \$10 postpaid anywhere in the world. Send checks, money orders or company orders to DIESEL AND GAS ENGINE CATALOG, 9110 Sunset

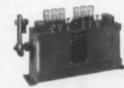
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Euclid Equipment V.P.



W W Pearso

William W. Pearsall has been elected vice president and a director of Euclid Equipment Inc., Freeport, N.Y., manufacturer of generator controls and switchgear according to Phillip Ferrari, the firm's president. Mr. Pearsall was formerly with General Motors Corp. for nine years. He

saw service in the Far East, Central & South America as Senior Sales Engineer in overseas sales and service for GM's Foreign Distributor's Division, power & industrial department. He will direct marketing of an expanded line of generator controls to suit a wide range of specifications and in devising custom units for most any requirement.

Demonstration Cruiser

Hoffars Ltd., Vancouver, B. C., recently took delivery of the demonstration cruiser, Keo Keo II. The boat, 32 ft. long with 11 ft. beam and 2 ft. 6 in. draft, was designed and built at Sidney, Vancouver Island. The vessel is fitted with a pair of the new General Motors, model 6V-53 diesel engines which are rated 195 cont. hp at 2800 rpm. They swing matching 17 in. diam. x 23 in. pitch



right and left hand Michigan propellers. The engines are fitted with Borg Warner $1\frac{1}{2}$:1 hydraulic reverse reduction gears. Tailshafts are $1\frac{1}{8}$ in. monel. The engines come equipped with built-in heat exchanger cooling. Elastomuffle rubber mufflers are used on the four exhaust pipes. The vessel has 2 position Wagner hydraulic steering with Morse single lever clutch and throttle controls. Trials were held on the nautical mile in English Bay at which time a top speed of 26.3 knots at 2800 rpm was attained. The ship has a cruising speed of 24 knots at 2600 rpm. Total width of the 6V-53 engine is 40 inches, length overall including reverse reduction gear is 50 in., height from engine beds to top of engine is 25 in.

Senior Consulting Engineer

Walter F. Strehlow has been named senior consulting engineer for the Tractor Group of the Allis-Chalmers Mfg. Co. Mr. Strehlow, who has been chief engineer at West Allis tractor works since 1939, joined the company 46 years ago in 1914. Last year he was awarded a



W. F. Strehlow

"certificate of recognition" from the Milwaukee Patent Law Association for "his ingenuity and outstanding contribution to society through the medium of the United States Patent System." He has received 30 U. S. patents and 20 foreign patents.

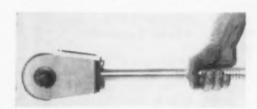
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Swench Manual Impact Wrench

The Swench wrench a simple, compact, light weight, and completely self contained hand operated, rachet type impact wrench which is said to enable any individual to handle the toughest bolting jobs with ease and safety is made by the Marquette Division of Curtiss-Wright Corp. The Swench uses automatically delivered, spring actuated, rotary hammer blows, or impacts, to produce tremendous magnification of the torsional force manually applied to the handle. It makes further use of this impact principle to give the user precise control of the magnified force delivered to a nut or bolt. The Swench wrench can be used for applying brute force to loosen a frozen nut or be switched immediately to the task of tightening a bolt to desired tension with greatly reduced manual effort. It also improves safety, increases the range of bolt sizes which can be handled by one wrench, and needs no power supply or auxiliary equipment. The Swench wrench combines a hand operated impact wrench, the principles of the hammer, the lever and the spring. When the unit is engaged with a nut through an impact type square drive socket and the handle is pulled, a heavy rotary hammer moves with the



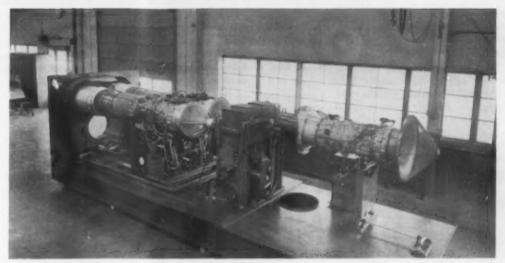
handle until the nut or bolt offers sufficient resistance to hold the head stationary against the initial force of the power spring in the handle. Movement of the handle then compresses the power spring, causing the energy applied to be stored in the spring as the handle advances. As the movement of the handle is continued, a set of cams, attached to the handle through the cover plate, raises the three pawls from the teeth of the rachet. When the handle has been advanced slightly more than 30°, the pawls are suddenly disengaged from the rachet teeth, allowing the heavy rotary hammer to snap forward rapidly through an arc of 30° under the drive of the energy stored during the compression of the power spring in the handle. The pawls, seated in the hammer head, then engage the next set of rachet teeth and deliver to them all of the momentum of the swiftly rotating, spring driven head, as a tremendous, torsional blow. For more information write the Marquette Division, Curtiss-Wright Corp., 1145 Galewood Dr., Cleveland 10, Ohio.

(ITS NEW



America's largest CM fuel injector rebuilder

Allison Engine For Air Supply Unit



Allison TE-1 air supply unit during assembly.

The first TE-1 air supply unit built by the Allison Division of General Motors Corp., was delivered to the Martin Co.'s Missile Division recently. The TE-1 includes the Allison T56 turbine engine and compressors and weighs a total of 24,000 lbs. It is 6 ft. tall, 61/2 ft. wide and 22 ft. long. Accessories, weighing 39,000 lbs., and the unit itself were airlifted to Denver by two Air Force C-124s. It will be installed at Martin's Denver operation and will power an acoustic device used to study effects of vibration on component parts of missiles. It can

produce up to 24,000 cu. ft. of air per minute at approx. 75 psi.

This use marks the first application of a production Allison turbine engine in an industrial application. The T56 engines power the C-130 Hercules, the Coast Guard SC-130B and the commercial version, the 501-D13, powers the Lockheed Electra. The T56 engines installed in the Martin supply unit utilize an industrial gear box and burn regular JP-4 aircraft type fuel.



Locknut, Bolts Brochure

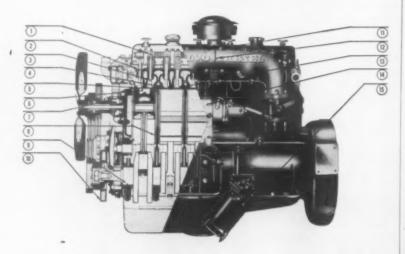
A new family of superbolts and companion locknuts for applications up to 900 degrees F. is covered in two new bulletins published by Standard Pressed Steel Co. Separate four-page bulletins review the new 900-degree aircraft bolt, the EWB 926, and mating featherweight self-locking nut, the FN 926. Between them, the two new fasteners comprise the first threaded joint of 200,000 lbs./ sq. in. ultimate tensile strength at 900 degrees. Room temperature tensile rating is 260,000 psi minimum. Literature gives specification information and reviews high reliability processing techniques used to manufacture the critical fasteners, weight-saving possibilities in design and general areas of application.

The EWB 926 bolt bulletin provides tabulated mechanical properties and a plot of tension-tension fatigue performance at various loads-at both room temperature and 900 degrees. The FN 926 literature, in addition to dimensional data, includes information on torquing properties and on the close dimensional control over nut face angularity. Beneficial effect of the latter on increased fatigue life is also covered. Copies of the EWB 926 bolt and FN 926 nut bulletins may be obtained by writing J. H. Hartley, Advertising Department, Box 1230, Standard Pressed Steel Co., Jenkintown, Pa. (ITS NEW)

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Toroidal "noiseless combustion" chamber (6) perfectly blends fuel and air to provide maximum power output and fuel economy, eliminating carbon deposits and wasteful exhaust fumes.

Wet cylinder liners (8) with rubber "o" rings mounted in engine block stop corrosion and wear, preventing cylinder misconfiguration. Pistons are quick and easy to replace. Eliminates costly reboring.

Wear-resistant valves (3) are built for extra long life. Stellited faces (4). Hard-chromed stems (2). Specially hardened alloy caps (1).

Long-life light alloy pistons (5) with hard-chromed upper piston rings resting in inserts (7) of special cast iron to withstand heat and pressure.

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Write Dept. D-2 for complete data on entire Volvo diesel engine line and Volvo sales and service.

Volvo import inc.
452 Hudson Terrace, Englewood Cliffs, N. J.



Transformer Bulletin

Features which contribute to speedy installation of Allis-Chalmers small, light, quiet, dry-type transformers in ratings 3 through 50 kva, single-phase, 600 volts and below, are described in a new bulletin released by the company. Designed for on-the-site load-center applications where critical voltage must be maintained, the ventilated transformer has a three-piece case with convenient knockout locations to permit standard size conduit to be connected from either side or bottom. Construction of the 80 C rise, ventilated, indoor dry-type transformer which provides quiet, low loss, low exciting current operation is described in the bulletin, which included dimensions for the unit. Copies of "Allis-Chalmers Dry-Type Transformers," 61B8222B, are available on request from Allis-Chalmers, Milwaukee 1, Wis-(ITS NEW)

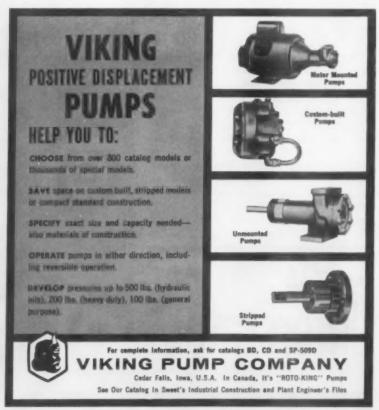
Advanced Systems Division

Minneapolis-Honeywell Regulator Co. has announced formation of a new corporate division whose primary objective will be "the advancement of the state of the art" of complex integrated control systems for industrial and military applications. The new "Special Systems division" will be headquartered at Pottstown, Pa., under John W. Morrison as general manager, in a facility that formerly was the company's Missile Equipment division. The new division will include the management, technical and production personnel of the Pottstown facility, as well as systems personnel and activities formerly located at the company's Brown Instruments Division in Philadelphia and Industrial Systems Division at Beltsville, Md. Functions of the new division will include research, development, design, fabrication, installation and checkout of specialized control systems and coordination of the design and fabrication of components for these control systems by other divisions of the company.

Allison Comptroller

Appointment of William A. Gossett as comptroller of Allison Division of General Motors was announced recently. He succeeds Oscar A. Lundin who was elected Treasurer of General Motors by the board of directors. Mr. Gossett, had been assistant comptroller in charge of General Accounting and Cost Analysis Sections of the General Motors Central Office, Financial Staff.

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Florida Diesel News

By Ed Dennis

THE Federal Aviation Agency is building an Overseas Traffic Control Center station southwest of Miami and out in the Glades. For power they will depend on a model 40-S X-8 Superior diesel engine rated 785 hp at 900 rpm with a 550 kw 277/480 volt ac Marathon generator. Specs also include Winslow filters, Air Maze air filters, a Young radiator and Fluor silencers. The engine is also equipped with intercoolers and a Perry water filter.

DIESEL Engine Sales of St. Augustine, launched the first of its Seafair class of yachts. Basically a 62 foot shrimp trawler hull, the *Lanran* is powered with a General Motors 6-110 marine diesel engine and 4.5:1 hydraulic r&r gears. Its average speed is 11 knots.

TWO International T-55 Payscrapers (14 cu. yd.) with Cummins HRB-600 diesels, 172 hp at 1800 rpm, are working for Cooper & Leonard Construction Co. near Tampa's new Industrial Park.

WATER control on the Montura Cattle Ranch, west of Clewiston, is being handled by three 36 in. turbine B-C siphon water pumps each powered by a model D318 Caterpillar diesel rated 90 cont. hp each.

ALLIS-Chalmers HD16 crawler tractors, each equipped with model 16000 Allis-Chalmers, four cycle diesels and rated 170 hp, were delivered (one each) to Camp Concrete Rock Products of Brooksville and Wiliston Shell Rock Products, Wiliston by Richardson Tractor Co.

TWO Cleveland Diesel Div. (GM) 8-268-A marine diesel engines, each rated 500 hp at 1270 rpm with Snow-Nabstedt r&r gears and Marquette governors, on the 110 ft. research vessel Lord Kelvin, which is being used in marine technical operations. For power generation, a three cylinder GM diesel is used.

TWO 300 hp Cummins diesel engines will power each of the two 64 ft. steel tugs that J. F. Bellinger & Sons, of Jacksonville, is building for the Revilo Corp. of Palatka.

BLANCHARD Machinery Inc., Miami, has been appointed South Florida distributors for the Sargent line of cranes and draglines. Continental ED-208, four cylinder 208 cu. in. diesels rated 61.5 hp are used for power in these cranes.

DETROIT Diesel Div. GM model 6-71-E diesel engines were installed by their Miami branch in an International R225 highway tractor with Fuller hi-speed transmission and in a Mack H63T tractor using the same Mack duplex transmission for the Hertz Corp.

A Petter PAZI auxiliary generator was installed on the newly launched trawler, Sherre-Elileen, by Diesel Engine Sales of St. Augustine. For main propulsion on this 62 footer, a GM 6-71E 170 hp marine diesel turning a 36 x 46 Federal propeller through Allison 4.5:1 r&r gears.

POWER Incorporated, Mercedes-Benz diesel distributors, delivered a model OM-636, rated 36 hp with 2:1 Paragon r&r gears, to Allied Marine of Miami and a model OM-321, rated 96 hp, to Merrill Stevens, Dinner Key. Both marine installations were in sailing craft.

TWO Waukesha, model NKDBSU, dieselized 150 kw, generating sets for the new Station #8 being built for the Central and Southern Florida Flood Control Commission.

NEAR Mt. Dora, the Hubbard Construction Co., is helping to reroute U.S. 441 across Lake Woodward. Currently being used in moving road material are two Euclid S 12, GM dieselized, 218 hp, scrapers plus a huge TS-24 Euclid twin powered 32 cu. yd. scraper, powered with a GM 6-110, 300 hp and a 6-71, 218 hp diesel; for push loading a C-6 Euclid tractor is used. These scrapers have Fuller 5G-1220 transmissions.

AT Edward Parkinson Co., Miami, two Diamond T 922 DF hiway tractors, powered with Cummins NH-220 diesel engines. These naturally aspirated diesels are rated 220 hp at 2100 rpm and have Spicer 5 C 720 transmissions; for Florida Plant Farms.

AMONG the dieselized road construction equipment, B. B. McCormick & Sons are using, on Highway 10 near Jacksonville, are four Allis-Chalmers HD-16 crawler tractors with Allis-Chalmers HD-844 diesels rated 170 hp and four Allis-Chalmers HD-21 tractors powered with model 21000 turbocharged, 225 hp, diesels.

TWO model D333 Caterpillar marine diesel engines, each rated 270 hp at 2200 rpm and Twin Disc r&r gears, for the 65 foot yacht Nautilus IV of Fort Lauderdale, from Shelley Tractor & Equipment Co., Miami.

THE Edna, a 38 ft. charter fishing vessel operated by Capt. Harry Jones of Fort Walton and Marathon, was repowered with a four cylinder Ford diesel engine and Paragon 2:1 r&r gears. The diesel is rated 68 hp at 2400 rpm and was marined by Modern Diesel Power Co. of Tampa.

FLORIDA Georgia Tractor Co., Miami, sold a model H-120 Hough Payloader tractor shovel to Oolite Rock Co. The unit is powered by a model NRT-6-B1 Cummins diesel rated 300 hp at 1200 rpm.

AT Fort Lauderdale, Ellis Diesel Sales & Service repowered the Candie Kidd, a drift fishing vessel out of Hillsboro Inlet, with two General Motors 4-71 diesel engines and 1.5:1 Allison hydraulic r&r gears.

THE Medical Research Building of the University of Miami received, as a standby unit, a D397 Caterpillar diesel, 350 kw, generating set. This unit has a cont. hp of 500. Shelley Tractor & Equipment of Miami engineered the installation.

Engineering Services Brochure

A broad range of design and engineering services, along with some unusual services to aid management and manufacturing, are detailed in a new 16 page brochure. Technical publication and graphic illustration services also are described. The brochure explains procedures for engaging engineering services, and the ease of initiating or discontinuing projects at customer's discretion. The brochure is available from Modern Engineering Service Co., P.O. Box 1007, Berkley, Mich.

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Tube Sheet Standards

To help establish standards for clad metal tube sheet, Bridgeport Brass Co. has submitted an engineering specification on copper and copper alloy clad steel plate for study by interested segments of industry. These products are of prime importance for corrosion control and high heat exchange efficiency in boilers, condensers, steam generators and similar heat transfer equipment. After industry acceptance the proposal entitled: "Tentative Specification for Copper and Copper Base Alloy Clad Steel Plate," will be evaluated for acceptance by the ASTM, SAE and appropriate technical societies. The Bridgeport specification establishes minimum standards for physical and mechanical properties, cladding method, chemical composition, test procedures, inspection and dimensional variations for circular and rectangular clad plate. Copper and copper alloys covered for cladding with

carbon steel and low alloy steel include: Electrolytic tough pitch copper, oxygen free copper, deoxidized high phosphorous copper, Muntz metal, naval brass, admiralty metal, 70-30 copper-nickel alloy, 90-10 copper-nickel alloy, Monel. For copies of the specification, write Bridgeport Brass Co., 30 Grand St., Bridgeport 2, Conn.

Turbine Instruction Set

A special Perkins Mars gas turbine instruction set is now in production at the Perkins Group's Eastfield plant at Peterborough. Perkins Gas Turbines Ltd. have received orders from a number of universities and technical colleges for the set, which educationalists say will fill a big gap in practical instruction on turbines. The set consists of a 50 hp Mars gas turbine fitted with a dynamometer and other special equipment to measure every aspect of its performance.

West Coast News

By James Joseph

NATIONAL Broadcasting Co., Belmont, Calif., has purchased a Caterpillar D330 set (75 kw at 1800 rpm) as standby generator for its Belmont transmitter. Sale by Peterson Tractor Co.

TO Consolidated Rock Products, Los Angeles, a Cummins C-160 to repower a Michigan 175A front-end loader.

DELIVERED: to Andrews Equipment Service, Spokane, a 200 kw trailermounted 21000 Allis-Chalmers generator set with brushless generator, 220/ 440-volt, 12-wire, for operation in Spokane area.

WORKING Santa Clara, Calif. road job: two Caterpillar DW-20s, repowered with Cummins NHRS-6-Cl diesels, owned by V. R. Dennis Construction Co., San Diego. Repowering job by E. W. Equipment Co.

WILLIAMS & Lane, Inc., GM diesel distributor for northern California, has opened a branch at Oroville, Calif.

PURCHASED by Transcon Lines, Los Angeles: 100 White-Freightliner tractors with Cummins NH-220 diesel engines and Fuller 5-CA-72 5-speed transmissions.

ESTABLISHED under new Dept. of Defense surplus sales consolidation set-up, a Consolidated Surplus Sales Office at U.S. Naval Supply Center, San Diego 31, Calif. to handle equipment disposal in Southern California area. Included: dieselized gear.

IMPERIAL Concrete Co., El Centro, Calif. has purchased two Austin-Western motor graders with Cummins C-160s (160 hp at 2500 rpm).

BURRIS Land Pit, Anaheim, Calif., has taken delivery of a model H90D Hough payloader powered by a Cummins C-175 diesel.

DELIVERED: to State of California highway maintenance station near Squaw Valley, a Caterpillar D\$18 turbocharged 100 kw at 1800 rpm standby generator set. Sale by San Leandro's Peterson Tractor Co.

INSTALLED: in W. R. Chamberlin Co.'s Alaska Cedar operating from Crescent City, Calif., a 15 in. Clark Converter. Sale by Hamilton Engine Sales, Inc., Portland, Oregon.

TREND toward school bus dieselization continues as Smith Diesel Sales, Colton, Calif., repowers a White school bus with a Cummins C-160 (switch from gasoline) for the Riverside School District.

DELIVERED: to a major oil company's southern California operations, a Murphy MP-24G (182 hp at 1000 rpm). Sale by Industrial Engine Service, Los Angeles.

HOSKINS Brothers, Oxnard, Calif., has repowered a Mack diesel truck with a Cummins NH-250. Sale reported by Cummins Service & Sales Co., Los Angeles.

TWO Cummins drive a new Threw MC-760 motor crane, put into operation by Reynolds Electric & Engineering Co., Mercury, Nevada. A Cummins NTO-6-BI provides main propulsion. Swing/hoist power is via a Cummins NH 220 with torque converter.

J. L. Chambers, San Rafael, Calif., has repowered his 55-ft. yacht *Blackfish* with a Caterpillar marine D318T, 175 hp (max) at 2000 rpm. Sale by Peterson Marine.

SOLD by Cummins Service & Sales, Los Angeles: two Cummins NH-250s (replacing Cummins 200 hp engines), one to H. I. Weaver, El Monte, Calif. hay hauler, the other to Union Oil Co.

DENVER-Chicago Trucking Co., Denver, has announced purchase of new road equipment totaling some \$1,000,000. Among the items: 32 diesel tractors, 35 vans and 20 refrigerated trailers to be distributed among D-C's 19 terminals.

IRONY: heavily shielded ground support vehicles, now being designed to work with U.S.'s first atomic-engined bomber, Convair's NX-2, will likely be dieselized.

CROWN Coach Corp., a major west coast school bus manufacturer, announces that some 60 per cent of current deliveries are dieselized buses, equipped with either Cummins' NHH-195 or NHH-220, both "pancake" types.

Allison Executive Changes

K. H. Hoffman, former manager, Transmissions Operations of the Allison Division of General Motors has been named administrative assistant to the general manager by H. H. Dice, vice president of General Motors and general manager of the Allison Division. R. E. Lynch, former manager, Aeroproducts Operations of the Allison Division at Vandalia, Ohio was named by Mr. Dice to succeed Mr. Hoffman as manager, Transmissions Operations in Indianapolis.



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SNAME Annual Meeting

The 68th Annual Meeting of The Society of Naval Architects and Marine Engineers will be held in New York City at The Waldorf-Astoria on November 16-19. These annual meetings of the group have culminated each year's activities since the formation of the society in 1893. The Council, governing body of the organization, will meet on Wednesday, November 16th. Six technical sessions in the morning and afternoon of November 17th and 18th will follow, these being open to the entire membership and their guests. This year a program encompassing the presentation of eleven technical papers has been planned. The annual banquet will be held in the Grand Ballroom of The Waldorf-Astoria on the evening of Friday, November 18th. The Annual Dinner Dance for members and their guests will also be held in the Grand Ballroom, being scheduled for Saturday, November 19th. The meetings and banquet will be presided over by Rear Admiral Albert G. Mumma, USN (Ret.). He is vice-president-engineering of the Worthington Corporation, Harrison, N.J. The Executive Committee of the Society met at the New York headquarters on September 21st to pass on pending applications of some 100 new members and plan for the annual meeting.

Eleven papers prepared by experts prominent in their respective fields will be presented at the technical sessions of the meeting. Among those of particu-

lar interest in the diesel or gas turbine field are the following: At the second session two papers will be read, as follows: "Design Aspects of Modern Marine Propulsion Turbines," by E. C. Rohde, Supervisor, Special Product Design, General Electric Company, Lynn, Mass. The author discusses the desired attributes of marine propulsion turbines from the user's standpoint, covering those design features conceived to provide efficient performance, adequate maneuverability, durability, reliability, controls for safety and convenience, and value. "Management Approach to Functional Arrangement Design," by David J. Barry, Bureau of Ships, Navy Department, Washington, D.C., will be presented at the third session. This paper directs attention to the important savings in both building and operating costs of a ship that will accrue from good functional design arrangements based on modern management principles.

"Submarine Tankers," by Vito L. Russo of the Maritime Administration, Harlan Turner, Jr., and Frank W. Wood, both of the Electric Boat Division, General Dynamics Corp. will be presented at the fifth session. The authors report on a study of the technical feasibility of submarine tankers ranging in deadweight carrying capacity from 20,000 to 40,000 tons, and in speed from 20 to 40 knots. "Some Aspects of Large Tanker Design," by W. O. Nichols, Jr., M. L. Rubin and R. V. Danielson, all of the Central Technical Department, Bethlehem Steel Company, Shipbuilding Di-

vision, Quincy, Mass. discusses various problems in tankers ranging from 25,000 to 106,000 deadweight tons.

Research Assistant Head

Walter W. Edens has been appointed assistant director of the Research Division of Allis-Chalmers Manufacturing Co. He had been supervisor of metallurgical research.

READY NOW! The completely new 1960 edition of the DIESEL AND GAS ENGINE CATALOG, Volume 25, can now be purchased. If you design, purchase, sell, operate or service diesel, dual fuel, or gas engines, the Catalog is essential to you and your business. This giant, 442 page, 10½ x 13½", fully illustrated reference book has been rewritten, revised and brought up to date completely from cover to cover and costs just \$10 postpaid anywhere in the world. Send checks, money orders or company orders to DIESEL AND GAS ENGINE CATALOG, 9110 Sunset Blvd., Los Angeles 46, Calif.





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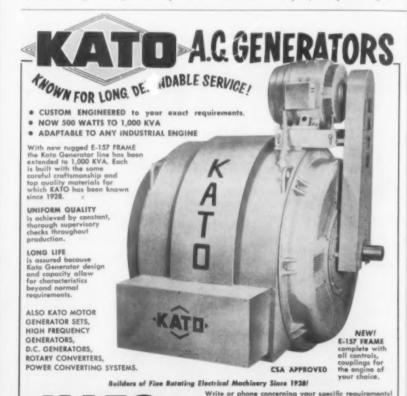


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Want minimum maintenance on a dual-fuel engine? -STANODIESEL Oil M

Stafford, Kansas Light Plant finds this lubricant helps hold down maintenance and operating expense



Bill Ray, (left), Standard Oil lubrication specialist calls on Stafford city su tendent LeRoy Priess. Rendering technical assistance to customers such a is Bill's job. He is qualified for it through seven years' service with Sta Oil Company, Bill is a graduate of Wichita University.

From February, 1953 to April, 1959 a 1,280 hp., 720 rpm., dual-fuel engine at the Stafford, Kansas Municipal Light Plant generated more than 12.5 million kilowatt hours in 29,780 hours of operation. At the end of this period the top piston rings were replaced; however, the amount of wear was almost too small to measure. Rings, pistons and cylinder walls showed only a negligible amount of carbon and varnish. Lube oil consumption was 7,399 gallons or 1,697 kw. hours per gallon.

You can get this kind of service with STANODIESEL Oil M. The oil's superior base stock, coupled with its additives gives you these maintenance and operating savings: low oil consumption, reduced port deposits, fewer stuck rings, less need for ring replacements, less cylinder wear, lower filtration costs and fewer bearing problems,

Learn more about STANODIESEL Oil M. Call the Standard Oil office near you in any of the 15 Midwest or Rocky Mountain states. Or write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.



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Quick facts about STANODIESEL OIL M

- * Keeps crankcase, pistons, cylinder walls clean.
- Combats deposit and wear prob-lems imposed by economy fuels.
- · Maintains film on difficult-to-lubricate parts.





Piston after 29,780 hours. Virtually no carbon deposits or varnish are visible.



From Princeton: A lesson in engine economy The facts from Princeton, Illinois: in 7 years'

operation of two Cooper-Bessemer engines, repair costs have been nil! They've never had the heads off. Maintenance has been confined to annual inspection and cleaning. The Turbocooled 4205 hp LSV-16 shown has operated

16,281 hours since installed in 1958. A 3600 hp LSV, installed in 1953 has logged 25,471 hours.

When you're planning expansion or modernization, take into account the proven economy of Cooper-Bessemer engines. Get all the facts



